

**THE
SILVER-BURDETT
ARITHMETICS**

**ELEMENTARY
BOOK**



PHILIPS & ANDERSON

THE SILVER-BURDETT ARITHMETICS

ELEMENTARY BOOK

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BOOK ONE
BOOK TWO
BOOK THREE



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PREFACE

THE Silver-Burdett Arithmetics have been prepared to meet the demand for instruction in arithmetic that will train pupils:

1. To a higher degree of accuracy and facility in using numbers.

2. To a more skillful application of numbers to the problems of everyday life.

3. To correct expression of the logical steps leading to results.

To secure these ends the authors have:

1. Provided an abundance of well-graded drill exercises.

2. Replaced theoretical and difficult exercises with practical problems.

3. Included enough model solutions to acquaint the pupil with correct forms, and to induce habits of neatness and order.

Book One is designed to cover the arithmetical work of the primary grades.

Chapter I is a systematic presentation of the arithmetic usually taught in the first two years. The aim of the chapter is to develop easily and naturally the idea of number without making use of elaborate pictures, to provide numerous exercises for making the pupil proficient through elementary addition and subtraction, and to acquaint him with some of the simplest facts and exercises of multiplication, division, and measures.

Although on account of varying demands and conditions, no arbitrary limit can be set for a year's work, Chapter II will be found to contain about what can be covered in the third year in a majority of schools. In this chapter, emphasis is placed on Addition and Subtraction, the Multiplication Tables, and simple Measurements.

Chapter III is planned to meet the usual demands for the work of the fourth year. It emphasizes Multiplication and Division, treats easy Fractions through addition and subtraction, and Decimals through hundredths; it enlarges upon the treatment of Measurements as found in Chapter II.

Attention is invited to the following features of the book:

1. *The new, simple, and practical problem material*, drawn from the field of the pupil's experience; and the number of exercises introduced to familiarize the pupil with life about him.

2. *The abundance of drill exercises in fundamental operations*, designed to afford means for the pupil to acquire accuracy and speed.

3. *The numerous exercises intended for busy work*, which serve to emphasize parts of the book that should receive special attention.

4. *The abundance of problems suitable for both oral and written solutions.*

5. *The topical arrangement.*

6. *The practical character of the illustrations*, in the form either of simple diagrams easily constructed by the pupil or else such pictures as have direct bearing on the subject or problem under consideration.

CONTENTS

CHAPTER I

	PAGE
COUNTING, READING, AND WRITING NUMBERS	1
Counting and Reading Numbers to 9	1
Counting, Reading, and Writing Numbers to 9	2
ADDITION	4
Combinations to 9	4
Use of + and = Signs	9
SUBTRACTION—NUMBERS INVOLVED: 9 OR LESS	13
Use of — Sign	15
FORMING, READING, AND WRITING NUMBERS	19
Forming, Reading, and Writing the Tens	19
Forming, Reading, and Writing Numbers between 10 and 20	21
Forming, Reading, and Writing Numbers between the Tens, from 20 to 99	23
REVIEW	25
ADDITION	26
Two Numbers of One Figure Each ; Sum, 10 or More	26
Combinations of More than Two Numbers of One Figure Each	28
SUBTRACTION—A NUMBER OF ONE FIGURE FROM A NUMBER OF TWO FIGURES ; DIFFERENCE, A NUMBER OF ONE FIGURE	30
REVIEW	31
FORMING, READING, AND WRITING NUMBERS	33
Numbers of Three Figures Each	33
ADDITION	36
A Number of One Figure to a Number of Two Figures ; Sum of the Units Less than 10	36
Numbers Involved : Less than 100 ; Sum of the Numbers in Each Col- umn, Less than 10	37
A Number of One Figure to a Number of Two Figures ; Sum of the Units, 10 or More	39
Numbers Involved, Less than 100 ; Sum of the Units, 10 or More	41

	PAGE
SUBTRACTION	43
Numbers Involved, Less than 100 ; the Lower Number in Each Column, Less than the Upper	43
Numbers Involved, Less than 100 ; the Lower Number in Units' Column More than the Upper	45
REVIEW	46
MULTIPLICATION AND DIVISION	49
Multiplying by 2	49
Multiplying by 3	51
Dividing by 2	52
Dividing by 3	54
Multiplying by 4	55
Multiplying by 5	56
Dividing by 4	58
Dividing by 5	59
LIQUID MEASURES	60
DRY MEASURES	61
MEASURES OF LENGTH	63
Purchases by the Yard	65
Some Market Prices	65
ROMAN NOTATION—TELLING TIME	66
REVIEW	68

CHAPTER II

READING AND WRITING NUMBERS TO 9999	70
ADDITION AND SUBTRACTION	74
The Forty-five Elementary Sums	74
Eighty Important Elementary Differences	75
ADDITION	76
A Number of One Figure to a Number of Two Figures ; Sum of the Units, Less than 10	76
The Sum in Any Column, Less than 10	77
A Number of One Figure to a Number of Two Figures ; Sum of the Units, 10 or More	78
The Sum in Any Column not Restricted	79
SUBTRACTION	83
The Lower Number in Each Column Less than the Upper	83

	PAGE
The Lower Number in One Column, or More than One Column, Greater than the Upper	84
ROMAN SYSTEM	86
UNITED STATES MONEY	88
MAKING CHANGE	91
MULTIPLICATION	92
Multiplying by 2 and by 3	92
DIVISION	96
Dividing by 2 and by 3	96
REVIEW	100
TIME	101
WEATHER CONDITIONS	105
Weather Conditions for March 12 in a Certain Year	105
MULTIPLICATION	106
Multiplying by 4 and by 5	106
Multiplying Numbers of Two Figures and Three Figures by 2, 3, 4, and 5	109
DIVISION	112
Dividing by 4 and by 5	112
Division with Remainders	114
Dividing Numbers of Two Figures and Three Figures by 2, 3, 4, and 5	115
REVIEW	118
LIQUID MEASURES	121
DRY MEASURES	122
MEASURES OF WEIGHT	124
Some Market Prices	125
MEASURES OF LENGTH	125
THE SQUARE	127
THE RECTANGLE OR OBLONG	129
REVIEW OF ADDITION AND SUBTRACTION	130
MULTIPLICATION—MULTIPLYING BY 6 AND BY 7	135
DIVISION—DIVIDING BY 6 AND BY 7	139
MULTIPLICATION	142
Multiplying by 8 and by 9	142
Multiplying Numbers of More than One Figure Each	145

	PAGE
DIVISION	147
Dividing by 8 and by 9	147
Dividing Numbers of More than One Figure Each	149
REVIEW OF MULTIPLICATION AND DIVISION	153
DIVISION	154
Results not Whole Numbers	154
Dividing by 2	154
Dividing by 3	155
Dividing by 4	156
Dividing by 6	158
Dividing by 8	159
Finding Two or More Parts of a Whole Number	162
MULTIPLICATION AND DIVISION	164
Multiplying by 10 and by 100	164
Multiplying by Numbers ending in 0's	166
Dividing by 10 and by 100	167
Dividing by Numbers ending in 0's	168
Multiplying by 11 and by 12	169
Multiplication Tables	171
Multiplying by Any Number of Two Figures	172
GENERAL REVIEW	174

CHAPTER III

NOTATION AND NUMERATION	179
Roman Notation	182
ADDITION	184
SUBTRACTION	186
MULTIPLICATION	188
Multipliers, Numbers of Two or of Three Figures	191
DIVISION	194
Dividing by Numbers of Two Figures Each ; Quotient, a Number of One Figure	195
Dividing by Numbers of Two or More Figures Each ; Quotient, a Number of More than One Figure	199
REVIEW	205

CONTENTS

ix

	PAGE
FRACTIONS	208
Introductory Exercises and Definitions	208
Halves, Fourths, and Eighths	208
Thirds, Sixths, and Twelfths	209
Reduction	213
Reducing Fractions to Higher Terms ; to Lower Terms	213
Reducing Fractions to Lowest Terms	214
Reducing Integers and Mixed Numbers to Fractions	214
Reducing Improper Fractions to Integers or Mixed Numbers	215
Addition and Subtraction	216
Multiplying Fractions and Mixed Numbers by Whole Numbers	221
Multiplying Whole Numbers by Fractions and by Mixed Numbers	223
Dividing Fractions and Mixed Numbers by Whole Numbers	226
REVIEW OF FRACTIONS	227
DECIMALS	230
Tenths	230
Hundredths	231
Reduction	232
Addition and Subtraction	233
United States Money	235
BILLS	243
A Receipted Bill for Goods purchased on the Same Date	243
REVIEW	244
MEASURES	247
Measures of Time	247
Measures of Length	250
Angles	252
Measures of Surface	253
The Square	253
The Rectangle	256
The Cube	258
The Rectangular Solid	261
Measures of Weight	262
MISCELLANEOUS TABLES	263
GENERAL REVIEW	265

ELEMENTARY ARITHMETIC

CHAPTER I

COUNTING, READING, AND WRITING NUMBERS

Counting and Reading Numbers to 9

1. Exercise :

Count the dots in each group.

•	• •	• • •	• • • •	• • • • •
one	two	three	four	five
1	2	3	4	5
• • • • •	• • • • • •	• • • • • • •	• • • • • • • •	• • • • • • • • •
six	seven	eight	nine	
6	7	8	9	

Count five ; count nine.

Point to the right dots and count *one, two, three, four, five, six, seven, eight, nine.*

Point to four dots ; five dots ; six dots ; nine dots.

Count nine and score thus :

I II III IIII ~~IIII~~ ~~IIII~~ I ~~IIII~~ II ~~IIII~~ III ~~IIII~~ IIII

Point to the right figure, and count *one, two, three, four, five, six, seven, eight, nine.*

Point to the figure that stands for six ; five ; eight ; seven ; four ; nine.

2 COUNTING, READING, AND WRITING NUMBERS

Name the figures in this row : 2, 1, 3, 4, 5.

Name the figures in this row : 6, 5, 8, 7, 9.

Name the figures in this row : 4, 2, 9, 5, 7, 3, 8, 1, 6.

What number comes next after five ?

What number comes next before six ? next after six ?

What number comes next before seven ? next after seven ?

Name the number that comes next before eight ; next after eight.

Counting, Reading, and Writing Numbers to 9

2. Exercise :

Read these numbers to the right from 1 ; to the left from 9.

1 2 3 4 5 6 7 8 9

Write the figure that stands for eight ; four ; six ; three ; nine ; five ; seven.

Read the numbers in the top row of this square.

8	6	3
2	4	7
1	9	5

Read the numbers in the middle row.

Read the numbers in the bottom row.

Begin at the top row and read each row from right to left.

Read the columns from top to bottom.

Read the columns from bottom to top.

Make eight dots on the blackboard.

Count backwards from four to one ; five to one ; six to one ; seven to one ; eight to one ; nine to one.

Make six crosses; thus, X X X X X X.

Find page 8 of this book; page 9; page 6.

Make seven rings; thus,

○ ○ ○ ○ ○ ○ ○

Make the figure 7 nine times; thus,

7 7 7 7 7 7 7 7 7

3. Exercise :

Make the figure that stands for four; six; nine. Count nine; count backwards from nine to one.

Point to your right; to your left; up; down. How many times did you point?

Point to your right knee; to your left knee; to your right eye; to your left eye; to your left ear; to your right ear. How many times did you point?

How many years old are you?

Read the numbers in this ring, beginning at 1; read around first to the left, then to the right.

Begin at 3 and read each way.

Begin at 9 and read each way; at 6; at 4; at 8.



Name all the colors that you know, and make a stroke for each color; how many did you make?

Name all the kinds of birds that you know, and make a stroke for each kind; how many did you make?

Name six things you would like to have for Christmas.

Name five things that grow on trees.

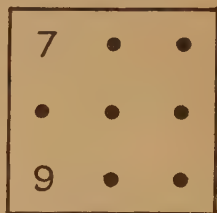
Name four things that are green.

Name two things that are cold.

Name four things that we can see by looking up.

Name five things that are round.

Write figures instead of the dots, writing them thus: 5 between 7 and 9; 6 at the end of the top row; 4 between 7 and 6; 3 in the middle row under 4; 1 at the end of the middle row; 8 in the lower right-hand corner; 2 between 9 and 8.



ADDITION

Combinations to 9

4. Exercise :

How many dots are 1 dot and 1 dot?

• •

How many strokes are 1 stroke and 1 stroke?

||

How many crosses are 1 cross and 1 cross?

X X

How many rings are 1 ring and 1 ring?

○ ○

How many are 1 and 1?

How many dots are 2 dots and 1 dot?
1 dot and 2 dots?

• • •

How many strokes are 2 strokes and 1 stroke?
1 stroke and 2 strokes?

|| |

How many crosses are 2 crosses and 1 cross?
1 cross and 2 crosses?

X X X

How many rings are 2 rings and 1 ring?
1 ring and 2 rings?

○ ○ ○

How many are 2 and 1? 1 and 2?

How many dots are 3 dots and 1 dot?
1 dot and 3 dots?

• • • •

How many strokes are 3 strokes and
1 stroke? 1 stroke and 3 strokes?

||| |

How many crosses are 3 crosses and
1 cross? 1 cross and 3 crosses?

x x x x

How many rings are 3 rings and 1 ring?
1 ring and 3 rings?

o o o o

How many are 3 and 1? 1 and 3?

How many dots are 2 dots and 2 dots?

• • • •

How many strokes are 2 strokes and 2
strokes?

|| ||

How many crosses are 2 crosses and 2
crosses? How many are 2 and 2?

x x x x

How many strokes are 4 strokes and 1
stroke? 1 stroke and 4 strokes?

|||| |

How many crosses are 4 crosses and 1
cross? 1 cross and 4 crosses?

x x x x x

How many rings are 4 rings and 1 ring?
1 ring and 4 rings?

o o o o o

How many are 4 and 1? 1 and 4?

How many dots are 3 dots and 2 dots?
2 dots and 3 dots?

• • • •

How many crosses are 3 crosses and 2
crosses? 2 crosses and 3 crosses?

x x x x x

How many rings are 3 rings and 2
rings? 2 rings and 3 rings?

o o o o o

How many are 3 and 2? 2 and 3?

How many dots are 5 dots and 1 dot? 1 dot and 5 dots?

.....

How many rings are 5 rings and 1 ring? 1 ring and 5 rings?

○ ○ ○ ○ ○ ○

How many crosses are 5 crosses and 1 cross? 1 cross and 5 crosses?

X X X X X X

How many are 5 and 1? 1 and 5?

How many dots are 4 dots and 2 dots? 2 dots and 4 dots?

.....

How many rings are 4 rings and 2 rings? 2 rings and 4 rings?

○ ○ ○ ○ ○ ○

How many crosses are 4 crosses and 2 crosses? 2 crosses and 4 crosses?

X X X X X X

How many are 4 and 2? 2 and 4?

How many dots are 3 dots and 3 dots?

.....

How many rings are 3 rings and 3 rings?

○ ○ ○ ○ ○ ○

How many crosses are 3 crosses and 3 crosses? How many are 3 and 3?

X X X X X X

How many dots are 6 dots and 1 dot? 1 dot and 6 dots?

.....

How many strokes are 6 strokes and 1 stroke? 1 stroke and 6 strokes?

||||||| |

How many are 6 and 1? 1 and 6?

How many dots are 5 dots and 2 dots? 2 dots and 5 dots?

.....

How many strokes are 5 strokes and 2 strokes? 2 strokes and 5 strokes?

||||| ||

How many are 5 and 2? 2 and 5?

How many dots are 4 dots and 3 dots?

3 dots and 4 dots?

.....

How many strokes are 4 strokes and 3 strokes? 3 strokes and 4 strokes?

||||| |||

How many are 4 and 3? 3 and 4?

How many dots are 7 dots and 1 dot?

1 dot and 7 dots?

.....

How many strokes are 7 strokes and 1 stroke? 1 stroke and 7 strokes?

||||||| |

How many are 7 and 1? 1 and 7?

How many dots are 6 dots and 2 dots?

2 dots and 6 dots?

.....

How many strokes are 6 strokes and 2 strokes? 2 strokes and 6 strokes?

||||||| ||

How many are 6 and 2? 2 and 6?

How many dots are 5 dots and 3 dots?

3 dots and 5 dots?

.....

How many strokes are 5 strokes and 3 strokes? 3 strokes and 5 strokes?

||||| |||

How many are 5 and 3? 3 and 5?

How many dots are 4 dots and 4 dots?

.....

How many strokes are 4 strokes and 4 strokes?

||||| |||

How many are 4 and 4?

How many dots are 8 dots and 1 dot?

1 dot and 8 dots?

.....

How many are 8 and 1? 1 and 8?

How many dots are 7 dots and 2 dots?
2 dots and 7 dots?



How many are 7 and 2? 2 and 7?

How many dots are 6 dots and 3 dots?
3 dots and 6 dots?



How many are 6 and 3? 3 and 6?

How many dots are 5 dots and 4 dots?
4 dots and 5 dots?



How many are 5 and 4? 4 and 5?

TO THE TEACHER. In drilling upon these combinations a variety of objects, sounds, and motions should be used.

5. Exercise :

How many marbles are 1 marble and 1 marble?

How many tops are 2 tops and 1 top? 1 top and 2 tops?

How many dolls are 3 dolls and 1 doll? 1 doll and 3 dolls?

How many roses are 2 roses and 2 roses?

How many pencils are 4 pencils and 1 pencil? 1 pencil and 4 pencils?

How many beans are 3 beans and 2 beans? 2 beans and 3 beans?

How many leaves are 5 leaves and 1 leaf? 1 leaf and 5 leaves?

How many buds are 4 buds and 2 buds? 2 buds and 4 buds?

How many stamps are 3 stamps and 3 stamps?

How many girls are 6 girls and 1 girl? 1 girl and 6 girls?

How many spools are 5 spools and 2 spools? 2 spools and 5 spools?

How many chairs are 4 chairs and 3 chairs? 3 chairs and 4 chairs?

How many boys are 7 boys and 1 boy? 1 boy and 7 boys?

How many letters are 6 letters and 2 letters? 2 letters and 6 letters?

How many birds are 5 birds and 3 birds? 3 birds and 5 birds?

How many splints are 4 splints and 4 splints?

How many crayons are 8 crayons and 1 crayon? 1 crayon and 8 crayons?

How many beads are 7 beads and 2 beads? 2 beads and 7 beads?

How many pins are 6 pins and 3 pins? 3 pins and 6 pins?

How many pens are 5 pens and 4 pens? 4 pens and 5 pens?

Use of + and = Signs

6. The sign + stands for **and**.

Thus, 3 and 2 may be written $3 + 2$.

7. The sign = stands for **are** or **is**.

Thus, 3 and 2 are 5 may be written $3 + 2 = 5$.

8. Exercise :

Read :

$1 + 1 = 2$

$2 + 1 = 3$

$2 + 2 = 4$

$3 + 2 = 5$

$4 + 2 = 6$

$4 + 3 = 7$

$5 + 3 = 8$

$5 + 4 = 9$

$3 \text{ cents} + 1 \text{ cent} = 4 \text{ cents.}$

$5 \text{ pears} + 2 \text{ pears} = 7 \text{ pears.}$

$6 \text{ marbles} + 3 \text{ marbles} = 9 \text{ marbles.}$

9. Putting 2 and 3 together to make one number is **adding** them.

10. The number that 2 and 3 make when put together is called their **sum**.

11. Exercise :

Copy, writing the proper figure after = :

$1 + 1 =$

$4 + 2 =$

$2 + 6 =$

$2 + 1 =$

$2 + 4 =$

$5 + 3 =$

$1 + 2 =$

$3 + 3 =$

$3 + 5 =$

$3 + 1 =$

$6 + 1 =$

$4 + 4 =$

$1 + 3 =$

$1 + 6 =$

$8 + 1 =$

$2 + 2 =$

$5 + 2 =$

$1 + 8 =$

$4 + 1 =$

$2 + 5 =$

$7 + 2 =$

$1 + 4 =$

$4 + 3 =$

$2 + 7 =$

$3 + 2 =$

$3 + 4 =$

$6 + 3 =$

$2 + 3 =$

$7 + 1 =$

$3 + 6 =$

$5 + 1 =$

$1 + 7 =$

$5 + 4 =$

$1 + 5 =$

$6 + 2 =$

$4 + 5 =$

12. Exercise :

Copy, and write under each line the sum of the numbers above it :

1	1	2	1	3
<u>1</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>1</u>
2	1	4	2	3
<u>2</u>	<u>4</u>	<u>1</u>	<u>3</u>	<u>2</u>

1	5	4	2	3	6
<u>5</u>	<u>1</u>	<u>2</u>	<u>4</u>	<u>3</u>	<u>1</u>

1	5	2	4	3	7
<u>6</u>	<u>2</u>	<u>5</u>	<u>3</u>	<u>4</u>	<u>1</u>

1	6	2	5	3	4	8
<u>7</u>	<u>2</u>	<u>6</u>	<u>3</u>	<u>5</u>	<u>4</u>	<u>1</u>

1	7	2	6	3	5	4
<u>8</u>	<u>2</u>	<u>7</u>	<u>3</u>	<u>6</u>	<u>4</u>	<u>5</u>

TO THE TEACHER. Drill on Sections 11 and 12 until the pupil can name the sums at sight.

13. Exercise :

Give the sums rapidly :

4	5	3	4	2	6	3	2	5	7
<u>2</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>2</u>	<u>4</u>	<u>5</u>	<u>3</u>	<u>2</u>

2 dolls and 1 doll are how many dolls ?

Tell a story of 2 dolls and 1 doll.

Make 3 strokes, then 2 more ; how many did you make ?

4 lambs and 2 sheep are how many animals ?

How many wheels have 2 wagons ?

4 boys and 3 girls are how many children ?

How much must I pay for a 4-cent tablet and a 2-cent pencil ?

How many roses are 6 red roses and 4 white ones ?

Which is more, 4 and 3, or 6 and 2 ?

Tell quickly how many are :

2 and 6 ; 3 and 5 ; 4 and 4 ; 1 and 7.

3 rows of corn and 1 row of beans are how many rows of both ?

4 robins and 2 wrens are how many birds ?

Name 5 girls ; 4 boys ; how many persons did you name ?

Say *book* 4 times, then 3 more times ; how many times did you say the word ?

Name 3 things that are round, and 2 things that are not round ; how many things did you name ?

Name 2 animals that can climb and 2 that cannot climb ; how many animals did you name ?

Name 3 things that can fly and 5 that can run ; how many things did you name ?

Tell quickly how many are :

6 and 3 ; 5 and 4 ; 3 and 6 ; 3 and 4 ; 7 and 2 ; 4 and 5

Draw a line and make 4 dots to the right of it and 5 dots to the left of it ; how many dots did you make ?

SUBTRACTION

Numbers Involved: 9 or Less

14. Exercise:

How many dots are 2 dots less 1 dot? ● ●

How many are 2 less 1?

How many strokes are 3 strokes less 1 stroke? |||

How many are 3 less 1?

How many strokes are 3 strokes less 2 strokes?

How many are 3 less 2?

How many rings are 4 rings less 1 ring?

How many are 4 less 1?

How many rings are 4 rings less 3 rings? ○ ○ ○ ○

How many are 4 less 3?

How many rings are 4 rings less 2 rings?

How many are 4 less 2?

How many squares are 5 squares less 1 square?

How many are 5 less 1?

How many squares are 5 squares less 4 squares?

How many are 5 less 4? □ □ □ □ □

How many squares are 5 squares less 2 squares?

How many are 5 less 2?

How many squares are 5 squares less 3 squares?

How many are 5 less 3?

How many crosses are 6 crosses less 1 cross?

How many are 6 less 1?

How many crosses are 6 crosses less 5 crosses?

How many are 6 less 5?

How many crosses are 6 crosses less 2 crosses?

How many are 6 less 2?

X X X X X X

How many crosses are 6 crosses less 4 crosses?

How many are 6 less 4?

How many crosses are 6 crosses less 3 crosses?

How many are 6 less 3?

How many strokes are 7 strokes less 1 stroke?

How many are 7 less 1?

How many strokes are 7 strokes less 6 strokes?

How many are 7 less 6?

How many strokes are 7 strokes less 2 strokes?

How many are 7 less 2?

|||||||

How many strokes are 7 strokes less 5 strokes?

How many are 7 less 5?

How many strokes are 7 strokes less 3 strokes?

How many are 7 less 3?

How many strokes are 7 strokes less 4 strokes?

How many are 7 less 4?

How many squares are 8 squares less 1 square?

How many are 8 less 1?

How many squares are 8 squares less 7 squares?

How many are 8 less 7?

How many squares are 8 squares less 2 squares?

How many are 8 less 2?

How many squares are 8 squares less 6 squares?

How many are 8 less 6? 

How many squares are 8 squares less 3 squares?

How many are 8 less 3?

How many squares are 8 squares less 5 squares?

How many are 8 less 5?

How many squares are 8 squares less 4 squares?

How many are 8 less 4?

How many dots are 9 dots less 1 dot?

How many are 9 less 1?

How many dots are 9 dots less 8 dots?

How many are 9 less 8?

How many dots are 9 dots less 2 dots?

How many are 9 less 2?

How many dots are 9 dots less 7 dots?

How many are 9 less 7?

How many dots are 9 dots less 3 dots? 

How many are 9 less 3?

How many dots are 9 dots less 6 dots?

How many are 9 less 6?

How many dots are 9 dots less 4 dots?

How many are 9 less 4?

How many dots are 9 dots less 5 dots?

How many are 9 less 5?

Use of — Sign

15. The sign — stands for less.

Thus, 3 less 2 = 1 may be written $3 - 2 = 1$.

16. Exercise :

Read :

$3 - 1 = 2$

$6 - 3 = 2$

$4 - 2 = 2$

$7 - 4 = 3$

$5 - 3 = 2$

$8 - 3 = 5$

$7 - 2 = 5$

$9 - 5 = 4$

$7 \text{ cents} - 5 \text{ cents} = 2 \text{ cents.}$

$8 \text{ apples} - 2 \text{ apples} = 6 \text{ apples.}$

$9 \text{ horses} - 4 \text{ horses} = 5 \text{ horses.}$

17. Taking 2 from 3 is called **subtracting** 2 from 3.

18. The number left by taking 2 from 3 is called the **remainder** or their **difference**.

19. Exercise :

Copy, writing the proper figure after = :

$2 - 1 =$

$6 - 2 =$

$8 - 6 =$

$3 - 1 =$

$6 - 4 =$

$8 - 3 =$

$3 - 2 =$

$6 - 3 =$

$8 - 5 =$

$4 - 1 =$

$7 - 1 =$

$8 - 4 =$

$4 - 3 =$

$7 - 6 =$

$9 - 1 =$

$4 - 2 =$

$7 - 2 =$

$9 - 8 =$

$5 - 1 =$

$7 - 5 =$

$9 - 2 =$

$5 - 4 =$

$7 - 3 =$

$9 - 7 =$

$5 - 2 =$

$7 - 4 =$

$9 - 3 =$

$5 - 3 =$

$8 - 1 =$

$9 - 6 =$

$6 - 1 =$

$8 - 7 =$

$9 - 4 =$

$6 - 5 =$

$8 - 2 =$

$9 - 5 =$

20. Exercise :

Copy, writing under each line the difference of the numbers above it :

2	3	3	4	4	4	5	5	5
<u>1</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>4</u>	<u>2</u>
5	6	6	6	6	6	7	7	7
<u>3</u>	<u>1</u>	<u>5</u>	<u>2</u>	<u>4</u>	<u>3</u>	<u>1</u>	<u>6</u>	<u>2</u>
7	7	7	8	8	8	8	8	8
<u>5</u>	<u>3</u>	<u>4</u>	<u>1</u>	<u>7</u>	<u>2</u>	<u>6</u>	<u>3</u>	<u>5</u>
8	9	9	9	9	9	9	9	9
<u>4</u>	<u>1</u>	<u>8</u>	<u>2</u>	<u>7</u>	<u>3</u>	<u>6</u>	<u>4</u>	<u>5</u>

TO THE TEACHER. Drill on the examples of Sections 19 and 20 until the pupil can name the differences at sight.

21. I sometimes stands for one. V sometimes stands for five.

22. A V-cent piece is worth five cents. A V-cent piece is sometimes called a nickel.

23. Exercise :

Give the differences rapidly :

9	6	7	5	7	6	8	7	8	8
<u>3</u>	<u>2</u>	<u>2</u>	<u>4</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>3</u>	<u>6</u>	<u>4</u>

How many birds are 4 birds less 2 birds ?

Make 6 strokes ; rub out 3 of them. How many are left ?

6 daisies are how many more than 4 daisies?

9 strokes are how many more than 6 strokes?

Tell quickly how many are:

$$8-6; 9-2; 9-3; 8-3; 9-4.$$

If you buy a 2-cent postage stamp, how much change should you get from a nickel?

A man has 5 horses; how many more must he buy to have 8 horses?

9 is how many more than 4?

A boy had 8 rockets and shot off 4 of them; how many had he left?

A dealer had 8 colts and sold 3 of them; how many had he left?

A farmer planted 9 trees, but 5 of them died; how many lived?

A girl found 7 eggs and broke 3 of them; how many had she left?

Mary bought a 3-cent pencil, and gave the storekeeper a nickel; how much change should he give her?

Jane was given 9 roses; 6 of them were white and the others red; how many were red?

7 days = 1 week

Begin with Sunday and name the days of the week; score a line for each day.

What day comes next after Sunday? next after Monday? next after Friday?

What day comes next before Sunday? next before Tuesday?

Sara went to her aunt's to stay a week ; she has stayed 4 days ; how many more days has she to stay ?

Last week 2 days were rainy, and the others were clear ; how many were clear ?

TO THE TEACHER. Toy money may be used to advantage in teaching the minor units of value.

FORMING, READING, AND WRITING NUMBERS

Forming, Reading, and Writing the Tens

24. 1. Ten ones make a ten.



2. Ten is written 10, which means **one** ten and **no** ones.

3. The figure 0 stands for **nothing** ; it is called **naught**, **cipher**, or **zero**.

4. Two tens make **twenty**, written 20.



5. Three tens make **thirty**, written 30.



6. Four tens make **forty**, written 40.



7. Five tens make **fifty**.



TO THE TEACHER. Use counters in teaching the tens only until the process of forming the tens is understood.

25. Exercise :

1. Write the figures that stand for fifty.
2. Six tens make what ?
3. Write the figures that stand for six tens.
4. Seven tens make what ?
5. Write the figures that stand for seven tens.
6. Eight tens make what ?
7. Write the figures that stand for eight tens.
8. Nine tens make what ?
9. Write the figures that stand for nine tens.
10. Write in figures the tens, beginning at ten.
11. Read across, then down, and tell how many tens there are in each of the following numbers :

20	30	50	60
80	70	90	40

12. Count by 10's to 90.
13. Count backwards by 10's from 90 to 10.
14. Give the name of 2 tens ; 4 tens ; 8 tens ; 3 tens
7 tens ; 9 tens ; 6 tens ; 5 tens.

10 cents = 1 dime

Read, supplying the missing numbers :

15. 2 dimes = ——— cents ; 3 dimes = ——— cents.
16. 4 dimes = ——— cents ; 9 dimes = ——— cents.
17. 7 dimes = ——— cents ; 6 dimes = ——— cents.
18. 5 dimes = ——— cents ; 8 dimes = ——— cents.

19. Write in figures :

fifty; thirty; seventy; ten; eighty; forty; ninety; twenty; sixty.

X sometimes stands for 10.

Forming, Reading, and Writing Numbers between Ten and
Twenty

26. 1. Ten and one are **eleven**, written 11.



2. Ten and two are **twelve**, written 12.



3. Ten and three are **thirteen**, written 13.



4. Ten and four are **fourteen**, written 14.



5. Ten and five are **fifteen**, written 15.



6. Ten and six are **sixteen**, written 16.



TO THE TEACHER. In teaching the numbers between ten and twenty use counters only until the process of forming the numbers between ten and twenty is understood.

27. Exercise :

1. Ten and seven make what number ?

2. Write in figures the number made up of ten and seven.

22 FORMING, READING, AND WRITING NUMBERS

3. Ten and eight make what number?
4. Write in figures the number made up of ten and eight.
5. Ten and nine make what number?
6. Write in figures the number made up of ten and nine.
7. Read these numbers and tell for what each figure stands:

	11	12	13	14	
15	16	17	18	19	

8. Count from ten to twenty.
9. Count from one to twenty.
10. Count from nine to one.
11. Count from twenty to ten.
12. Count from twenty to one.
13. Write in figures :
fourteen; ten; thirteen; eighteen; eleven;
seventeen; fifteen; nineteen; twelve; sixteen.
14. Name the number made up of :
ten and three; ten and one; ten and five; ten
and two; ten and six; ten and four; ten and
eight; ten and nine; ten and seven.
15. What number comes next after fourteen? next
before fourteen? next after eighteen? next be-
fore eighteen? next before twelve? next after
twelve?
16. Count by twos to ten; to twenty.

Forming, Reading, and Writing Numbers between the Tens
from 20 to 99

28. 1. Two tens and one make twenty-one, written 21.



2. Two tens and two make twenty-two, written 22.



3. Two tens and three make twenty-three, written 23.



4. Three tens and one make thirty-one, written 31.



29. Exercise :

Name and write in figures the number that is formed by :

- | | |
|------------------------|------------------------|
| 1. two tens and four. | 2. two tens and five. |
| 3. two tens and six. | 4. two tens and seven. |
| 5. two tens and eight. | 6. two tens and nine. |

Name and write in figures the number that is formed by :

- | | |
|---------------------------|---------------------------|
| 7. three tens and two. | 8. three tens and three. |
| 9. three tens and four. | 10. three tens and five. |
| 11. three tens and six. | 12. three tens and seven. |
| 13. three tens and eight. | 14. three tens and nine. |

Name the number that is formed by :

15. forty and one ; forty and two ; forty and three.
16. forty and four ; forty and five ; forty and six.
17. forty and seven ; forty and eight ; forty and nine.

30. Exercise :**1. Read :**

41 42 43 44 45 46 47 48 49

2. Name the numbers from :

fifty to sixty ; sixty to seventy ; seventy to eighty ;
eighty to ninety ; ninety to ninety-nine.

3. Read across ; read down :

51 52 53 54 55 56 57 58 59

61 62 63 64 65 66 67 68 69

71 72 73 74 75 76 77 78 79

81 82 83 84 85 86 87 88 89

91 92 93 94 95 96 97 98 99

TO THE TEACHER. In teaching the numbers between the tens from 20 to 99, use objects only until the plan of forming, naming, and writing the numbers between the tens is understood.

4. Read :

22 34 92 36 64 58 45 13 79

56 65 99 83 71 84 18 46 33

Count from :

5. 20 to 30 ; 30 to 20 ; 30 to 40 ; 40 to 30.

6. 40 to 50 ; 50 to 40 ; 50 to 60 ; 60 to 50.

7. 60 to 70 ; 70 to 60 ; 90 to 99 ; 99 to 90.

In numbers of two figures the right-hand figure is called the *units'*, or *ones'*, figure, and the left-hand figure the *tens'* figure.

Write in figures and name the number made up of:

8. 3 tens and 2 ones; 4 tens and 5 ones.
9. 8 tens and 2 ones; 9 tens and 1 one.
10. 6 tens; 3 tens and 9 units.
11. 5 tens and 6 units; 7 tens and 2 units.
12. 9 tens; 2 tens and 2 units.

REVIEW

31. Exercise :

1. Count by twos to ten; to twenty.
2. Begin at one and count by twos to nine.
3. Count backwards by twos from ten.
4. What two numbers come between 13 and 16?
5. What three numbers come between 14 and 18?
6. State instantly the sum:

$6+2$	$2+5$	$5+3$	$3+3$	$4+4$
$4+5$	$2+4$	$7+2$	$3+2$	$4+3$

- ✓ 7. State instantly the difference:

$9-5$	$8-4$	$9-7$	$7-5$	$9-2$
$8-3$	$7-2$	$6-3$	$9-3$	$8-2$
$7-3$	$9-4$	$8-5$	$7-4$	$9-6$

- ✓ 8. Read, supplying the missing number at sight:

$?+3=7$	$5+?=7$	$8-?=5$	$?+5=8$
$9-?=6$	$4+?=7$	$?+6=9$	$9-?=4$
$?-5=4$	$3+?=8$	$7-?=3$	$?+4=9$
$?-5=3$	$5+?=9$	$7-?=5$	$?-2=5$

9. 2 cents and how many cents make a dime?
10. A nickel and 2 cents are worth how many cents?
11. I have 6 eggs; how many more must I get to have 9 eggs?
12. Name two numbers that when added will make 9.
13. A farmer had 8 lambs and sold all of them but 2; how many did he sell?
14. 4 years ago Mary was 5 years old; how old is she now?
15. If 4 pupils are absent from a class of nine, how many are present?
16. Tell for what each figure stands in the following numbers:

72	46	58	15	61
94	77	35	29	83

Thus, in 72, the 7 stands for 7 tens and the 2 for 2 units.

ADDITION

Two Numbers of One Figure Each; Sum, 10 or More

32. Exercise:

Copy, supplying the missing numbers:

$9 + 1 =$	$8 + 3 =$	$5 + 7 =$	$6 + 8 =$
$1 + 9 =$	$3 + 8 =$	$6 + 6 =$	$7 + 7 =$
$8 + 2 =$	$7 + 4 =$	$9 + 4 =$	$9 + 6 =$
$2 + 8 =$	$4 + 7 =$	$4 + 9 =$	$6 + 9 =$

$7 + 3 =$	$6 + 5 =$	$8 + 5 =$	$8 + 7 =$
$3 + 7 =$	$5 + 6 =$	$5 + 8 =$	$7 + 8 =$
$6 + 4 =$	$9 + 3 =$	$7 + 6 =$	$8 + 8 =$
$4 + 6 =$	$3 + 9 =$	$6 + 7 =$	$9 + 7 =$
$5 + 5 =$	$8 + 4 =$	$9 + 5 =$	$7 + 9 =$
$9 + 2 =$	$4 + 8 =$	$5 + 9 =$	$9 + 8 =$
$2 + 9 =$	$7 + 5 =$	$8 + 6 =$	$8 + 9 =$
			$9 + 9 =$

33. Arrange the examples of Section 32 like those of Section 12 and write under each line the sum of the numbers above it.

TO THE TEACHER. Use objects or drawings to find the sums in Exercise 32 only when necessary to do so; then see *To the Teacher*, Section 4.

34. Exercise :

1. 8 cents + ——— cents = 1 dime.
2. Our flag has 7 red stripes and 6 white ones; how many stripes has it in all?
3. 8 boys and 6 girls are how many children?

12 is sometimes called a dozen

4. 6 eggs + how many eggs make a dozen?
5. Frank was 9 years old 6 years ago; how old is he now?
6. This morning James drove 8 cows to one field and 9 to another; how many did he drive to both?
7. One of our ducks hatched 8 ducklings, and another 5; both hatched how many?

8. This morning father had in the mail 8 letters and 3 papers; how many pieces did he have in all?

9. A grocer delivered 8 loads of goods in the morning and 4 in the afternoon; how many did he deliver that day?

10. A 5-cent bar of soap and an 8-cent can of corn cost how much?

11. I earned 9 cents this morning selling papers and 5 cents running an errand; how much did I earn in all?

12. Samuel counted 9 blackbirds in one flock and 8 in another; how many did he count in both?



13. Start at 3 and add rapidly once around the ring; start at 2.

14. Point rapidly to each outer number, and as you do so add 2 to it. Change the inner number to 3 and add; to 4; to 5; to 6; to 7; to 8; to 9.



15. I cut 7 roses from my rosebush on Monday and 9 on Tuesday; how many did I cut from it both days?

Combinations of More than Two Numbers of One Figure Each

35. Exercise:

Add upward:

1. 1	2. 2	3. 3	4. 2	5. 4	6. 5
1	1	2	2	2	3
<u>1</u>	<u>1</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>1</u>

7. 3	8. 4	9. 4	10. 5	11. 6	12. 6
3	3	4	3	2	1
<u>3</u>	<u>2</u>	<u>4</u>	<u>4</u>	<u>5</u>	<u>4</u>
13. 3	14. 4	15. 7	16. 6	17. 8	18. 9
5	3	7	5	4	7
<u>4</u>	<u>5</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>2</u>
19. 1	20. 2	21. 2	22. 4	23. 5	24. 7
1	2	3	4	4	4
2	1	1	2	3	3
<u>1</u>	<u>2</u>	<u>2</u>	<u>3</u>	<u>2</u>	<u>2</u>

25. Find the cost of a 5-cent tablet, a 3-cent pencil, and a 1-cent sponge.

26. 2 wrens, 3 robins, and 4 swallows are how many birds?

27. 5 roses, 2 violets, and 6 buttercups are how many flowers?

28. 2 sheep, 4 cows, 2 horses, and 2 mules are how many animals?

29. 4 girls, 3 boys, 5 men, and 4 women are how many persons?

30. Mary had 2 nickels; she then found 1 cent and her mother gave her 2 cents. How much money did she then have?

31. How many are $2 + 3 + 4 + 6$?

32. How many are $7 + 2 + 1 + 3 + 4 + 2$?

SUBTRACTION

A Number of One Figure from a Number of Two Figures; Difference, a Number of One Figure**36. Exercise :**

Copy, supplying the missing numbers :

$10 - 1 =$	$11 - 3 =$	$12 - 7 =$	$14 - 8 =$
$10 - 9 =$	$11 - 8 =$	$12 - 6 =$	$14 - 7 =$
$10 - 2 =$	$11 - 4 =$	$13 - 4 =$	$15 - 6 =$
$10 - 8 =$	$11 - 7 =$	$13 - 9 =$	$15 - 9 =$
$10 - 3 =$	$11 - 5 =$	$13 - 5 =$	$15 - 7 =$
$10 - 7 =$	$11 - 6 =$	$13 - 8 =$	$15 - 8 =$
$10 - 4 =$	$12 - 3 =$	$13 - 6 =$	$16 - 7 =$
$10 - 6 =$	$12 - 9 =$	$13 - 7 =$	$16 - 9 =$
$10 - 5 =$	$12 - 4 =$	$14 - 5 =$	$16 - 8 =$
$11 - 2 =$	$12 - 8 =$	$14 - 9 =$	$17 - 8 =$
$11 - 9 =$	$12 - 5 =$	$14 - 6 =$	$17 - 9 =$
			$18 - 9 =$

37. Exercise :

1. 11 cents less 8 cents are how many cents?
2. My visit is to last 10 days. I have been away a week; how many more days have I to spend on my visit?
3. Caroline invited 13 girls to her birthday party; 5 of them did not come. How many came?
4. Frank had 15 picture post cards and mailed all of them but 6; how many did he mail?
5. 9 of a class of 16 are girls; how many are boys?
6. Mother had a dozen cakes but 5 of them have been eaten; how many has she left?

7. There are 9 persons in a boat that will carry 16; how many more will it carry?

8. I want to put 15 cents into our school savings each week. I have put in 9 cents this week; how many more cents must I put in?

9. Subtract rapidly 2 from each number on the first line, 3 from each number on the second, and so on; name results only.

8	5	10	9	6	11	7	4	2
12	9	6	11	8	5	10	7	3
6	12	10	8	11	9	7	13	4
14	12	10	8	13	11	9	7	5
13	15	11	9	14	12	10	8	6
16	14	10	15	13	12	11	9	7
16	17	15	10	14	12	13	11	8
18	16	12	14	15	17	13	11	9

REVIEW

38. Exercise:

- Count backwards by twos from 18.
- Start at 19 and count backwards by twos to 1.
- Write and read the two numbers that can be written with:

7 and 5

4 and 8

2 and 1

6 and 9

3 and 7

5 and 9

4. Supply at sight the missing numbers ; have no two examples alike :

$?\ +\ ? = 6$

$?\ +\ ? = 7$

$?\ +\ ? = 8$

$?\ +\ ? = 9$

$?\ +\ ? = 6$

$?\ +\ ? = 7$

$?\ +\ ? = 8$

$?\ +\ ? = 9$

$?\ +\ ? = 6$

$?\ +\ ? = 7$

$?\ +\ ? = 8$

$?\ +\ ? = 9$

Subtract rapidly each outer number in each ring from the inner number, naming the results only :

5.



6.



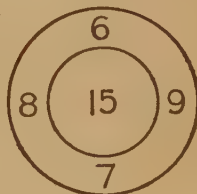
7.



8.



9.



10. How many are 16 less 7? 16 less 9? 17 less 8? 16 less 8? 17 less 9?

11. $7 + 2 + 4 - 5 = ?$

Answer thus : 7, 9, 13, 8.

12. $9 - 4 + 6 - 7 = ?$

13. $9 - 4 + 6 - 3 = ?$

14. $14 - 9 + 8 - 6 = ?$

15. $18 - 9 - 3 - 4 = ?$

16. Out of a dozen eggs, mother used 3 for breakfast, 4 for dinner, and 4 for supper ; how many were then left?

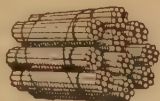
17. There are 4 chairs at each side of a table and 1 at each end ; how many are there in all ?

18. From a box of 1 dozen collars, 6 were sold to one man, 3 to another, and 1 to another ; how many then remained ?

FORMING, READING, AND WRITING NUMBERS

Numbers of 3 Figures Each

39. Ten tens make a hundred, written 100, which means one hundred, no tens, and no units.



40. Exercise :

Write in figures :

- | | | |
|-------------------|-------------------|-------------------|
| 1. two hundred. | 2. three hundred. | 3. four hundred. |
| 4. five hundred. | 5. six hundred. | 6. seven hundred. |
| 7. eight hundred. | 8. nine hundred. | 9. one hundred. |

41. One hundred and one make one hundred one, written 101, which means one hundred, no tens, and one unit.

42. Exercise :

Name, and write in figures, the number made by uniting with one hundred :

- | | | | |
|---------|-----------|-----------|----------|
| 1. two. | 2. three. | 3. four. | 4. five. |
| 5. six. | 6. seven. | 7. eight. | 8. nine. |

43. One hundred and ten make one hundred ten, written 110, which means one hundred, one ten, and no units.

34 FORMING, READING, AND WRITING NUMBERS

44. Exercise :

Name, and write in figures, the numbers made by uniting with one hundred :

- | | | | |
|------------|-------------|------------|------------|
| 1. twenty. | 2. thirty. | 3. forty. | 4. fifty. |
| 5. sixty. | 6. seventy. | 7. eighty. | 8. ninety. |

45. One hundred and eleven make **one hundred eleven**, written **111**.

46. Exercise :

Write in figures :

- | | |
|---------------------------|--------------------------|
| 1. two hundred ten. | 2. three hundred forty. |
| 3. four hundred seventy. | 4. five hundred eighty. |
| 5. six hundred sixty. | 6. seven hundred twenty. |
| 7. eight hundred seventy. | 8. nine hundred ten. |

Write in figures the numbers between :

- | | | |
|------------------|------------------|------------------|
| 9. 110 and 120. | 10. 150 and 160. | 11. 190 and 200. |
| 12. 200 and 210. | 13. 280 and 290. | 14. 350 and 360. |
| 15. 420 and 430. | 16. 560 and 570. | 17. 630 and 640. |
| 18. 760 and 770. | 19. 820 and 830. | 20. 980 and 990. |

21. Read across ; read down :

101	212	900	516	159	202
112	300	901	642	222	301
307	426	910	257	906	311
219	510	777	600	819	401

Count from:

- | | | |
|-----------------|-----------------|-----------------|
| 22. 100 to 110. | 23. 200 to 210. | 24. 440 to 450. |
| 25. 560 to 570. | 26. 720 to 730. | 27. 880 to 890. |
| 28. 970 to 980. | 29. 350 to 360. | 30. 630 to 640. |

Count backwards from:

- | | | |
|-----------------|-----------------|-----------------|
| 31. 110 to 100. | 32. 200 to 190. | 33. 320 to 310. |
| 34. 490 to 480. | 35. 500 to 490. | 36. 620 to 610. |
| 37. 760 to 740. | 38. 820 to 800. | 39. 999 to 980. |

In numbers of three figures the first, counting from the right, is called the **units'** figure, the second the **tens'** figure, and the third the **hundreds'** figure.

Name and write in figures the number made up of:

- | | |
|--|----------------------------|
| 40. 7 hundreds. | 41. 7 hundreds and 1 unit. |
| 42. 3 hundreds, 2 tens, and 1 unit. | |
| 43. 3 hundreds. | 44. 7 hundreds and 1 ten. |
| 45. 9 hundreds, 1 ten, and 2 units. | |
| 46. Tell for what each figure stands in the following: | |

234	496	507	820	900
888	801	399	660	700

Write and read the six numbers that can be written with:

- | | |
|------------------|------------------|
| 47. 7, 3, and 1. | 48. 4, 8, and 2. |
| 49. 9, 7, and 6. | 50. 4, 5, and 8. |

ADDITION

A Number of One Figure to a Number of Two Figures: Sum of the Units, Less than 10

47. Exercise :

1. Add at sight:

10	20	30	40	50	60	70	80	90
<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>

Instead of 2, add 3; 6; 4; 7; 9; 8; 5.

In Examples 2-8 arrange the numbers to be added as they are arranged in Example 1, and add at sight, naming results only:

2. Each of the numbers 2, 5, 3, 6, 4, 8, 7, to

11	21	31	41	51	61	71	81	91
----	----	----	----	----	----	----	----	----

3. Each of the numbers 2, 5, 3, 6, 4, 7, to

12	22	32	42	52	62	72	82	92
----	----	----	----	----	----	----	----	----

4. Each of the numbers 2, 5, 3, 6, 4 to

13	23	33	43	53	63	73	83	93
----	----	----	----	----	----	----	----	----

5. Each of the numbers 2, 5, 4, 3 to

14	24	34	44	54	64	74	84	94
----	----	----	----	----	----	----	----	----

6. Each of the numbers 2, 4, 3 to

15	25	35	45	55	65	75	85	95
----	----	----	----	----	----	----	----	----

7. Each of the numbers 3 and 2 to

16	26	36	46	56	66	76	86	96
----	----	----	----	----	----	----	----	----

8. Add 2 to

17 27 37 47 57 67 77 87 97

TO THE TEACHER. Using the sums found in Section 47, drill upon the corresponding differences. Thus, in Example 1, subtract at sight 2 from each sum found by adding 2 to 10, 20, 30, etc.; name results only.

Numbers Involved: Less than 100; Sum of the Numbers in Each Column, Less than 10

48. Add 26 and 32.

26 2 units and 6 units are 8 units.

32 3 tens and 2 tens are 5 tens.

58 *In practice say : 2 and 6 are 8; 3 and 2 are 5.*

49. Exercise :

Copy and add :

1. 20 <u>30</u>	2. 40 <u>50</u>	3. 20 <u>60</u>	4. 50 <u>40</u>	5. 30 <u>50</u>
6. 20 <u>17</u>	7. 42 <u>20</u>	8. 36 <u>40</u>	9. 56 <u>21</u>	10. 43 <u>36</u>
11. 56 <u>32</u>	12. 52 <u>35</u>	13. 18 <u>81</u>	14. 32 <u>55</u>	15. 17 <u>72</u>
16. 16 <u>52</u> <u>31</u>	17. 80 <u>11</u> <u>7</u>	18. 42 <u>5</u> <u>31</u>	19. 4 <u>42</u> <u>23</u>	20. 43 <u>22</u> <u>13</u>
21. 33 <u>10</u> <u>35</u>	22. 42 <u>15</u> <u>31</u>	23. 32 <u>6</u> <u>21</u>	24. 20 <u>32</u> <u>17</u>	25. 41 <u>14</u> <u>33</u>

26.	27.	28.	29.
42 cars	27 bricks	67 houses	12 brooms
<u>31 cars</u>	<u>52 bricks</u>	<u>32 houses</u>	<u>22 brooms</u>
cars	bricks	houses	brooms
30.	31.	32.	33.
20 lemons	17 apples	32 plums	46 peaches
<u>52 lemons</u>	<u>51 apples</u>	<u>14 plums</u>	<u>33 peaches</u>
34.	35.	36.	37.
9 trout	13 frogs	51 ducks	24 rabbits
80 trout	65 frogs	6 ducks	32 rabbits
<u>10 trout</u>	<u>11 frogs</u>	<u>32 ducks</u>	<u>3 rabbits</u>

50. Exercise :

1. In a class there are 7 boys and 12 girls; how many children are there in the class?

2. Last week Frank earned 35 cents, and this week he has earned 42 cents; how much has he earned both weeks?

3. A boy spent 12 cents for marbles, 15 cents for a ball, and 10 cents for a top; how much did he spend for all?

4. On our lawn there are 12 maple trees, 2 ash trees, and 4 willow trees; how many trees are there on our lawn?

5. In one day a boy sold 42 morning papers and 33 evening papers; how many papers did he sell that day?

6. How many persons are there seated at three tables, if there are 12 persons at one of them, 10 at another, and 8 at another?

7. A woman used 14 eggs on Monday, 11 on Tuesday, and a dozen on Wednesday; how many did she use during the three days?

8. Find the cost of a 15-cent knife, a 20-cent story book, and a 12-cent fishing line.

9. Frank has 12 pigeons, George has 32, and William has 15; how many have they together?

10. Find the amount of Margaret's bill if she made these purchases:

1 piece of tape, 12 cents.

1 spool of thread, 5 cents.

1 hat pin, 10 cents.

1 card of hooks and eyes, 2 cents.

**A Number of One Figure to a Number of Two Figures;
Sum of the Units, 10 or More**

51. Exercise:

1. Add at sight:

19	29	39	49	59	69	79	89
<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>

Instead of 2, add 1; 3; 5; 6; 4; 8; 7; 9.

In Examples 2-9 arrange the numbers to be added as they are arranged in Example 1, and add at sight, naming results only.

2. Each of the numbers 2, 5, 3, 6, 4, 8, 7, 9 to

18 38 58 28 48 68 88 78

3. Each of the numbers 5, 3, 6, 4, 8, 7, 9 to

17 37 57 27 47 67 87 77

4. Each of the numbers 5, 8, 6, 9, 7, 4 to

16 36 56 26 46 66 86 76

5. Each of the numbers 5, 8, 6, 7, 9 to

15 35 55 25 45 65 85 75

6. Each of the numbers 6, 8, 7, 9 to

14 34 54 24 44 64 84 74

7. Each of the numbers 8, 7, 9 to

13 33 53 23 43 63 83 73

8. Each of the numbers 8 and 9 to

12 32 52 22 42 62 82 72

9. 9 to

11 31 51 21 41 61 81 71

TO THE TEACHER. Using the sums found in Section 51, drill upon the corresponding differences. See *To the Teacher*, page 37.

Numbers Involved, Less than 100; Sum of the Units, 10 or More

52. Add 58 and 34.

58 4 units and 8 units are 12 units, or 1 ten and 2 units.
 34 Write 2 in units' place and add 1 to the tens.
 92 1 ten, 3 tens, and 5 tens are 9 tens.
 Write 9 in tens' place. The sum is 92.
In practice say: 4 and 8 are 12; 1, 3, and 5 are 9.

53. Exercise :

Copy and add :

1. $\begin{array}{r} 24 \\ 28 \\ \hline \end{array}$	2. $\begin{array}{r} 32 \\ 18 \\ \hline \end{array}$	3. $\begin{array}{r} 16 \\ 25 \\ \hline \end{array}$	4. $\begin{array}{r} 41 \\ 49 \\ \hline \end{array}$	5. $\begin{array}{r} 55 \\ 38 \\ \hline \end{array}$
--	--	--	--	--

6. $\begin{array}{r} 46 \\ 47 \\ \hline \end{array}$	7. $\begin{array}{r} 52 \\ 29 \\ \hline \end{array}$	8. $\begin{array}{r} 63 \\ 18 \\ \hline \end{array}$	9. $\begin{array}{r} 78 \\ 19 \\ \hline \end{array}$	10. $\begin{array}{r} 37 \\ 47 \\ \hline \end{array}$
--	--	--	--	---

11. $\begin{array}{r} 56 \\ 28 \\ \hline \end{array}$	12. $\begin{array}{r} 19 \\ 51 \\ \hline \end{array}$	13. $\begin{array}{r} 26 \\ 64 \\ \hline \end{array}$	14. $\begin{array}{r} 53 \\ 29 \\ \hline \end{array}$	15. $\begin{array}{r} 28 \\ 68 \\ \hline \end{array}$
---	---	---	---	---

16. $\begin{array}{r} 16 \\ 32 \\ 14 \\ \hline \end{array}$	17. $\begin{array}{r} 28 \\ 41 \\ 23 \\ \hline \end{array}$	18. $\begin{array}{r} 56 \\ 13 \\ 22 \\ \hline \end{array}$	19. $\begin{array}{r} 38 \\ 40 \\ 19 \\ \hline \end{array}$	20. $\begin{array}{r} 14 \\ 7 \\ 46 \\ \hline \end{array}$
---	---	---	---	--

21. $\begin{array}{r} 48 \\ 7 \\ 9 \\ \hline \end{array}$	22. $\begin{array}{r} 25 \\ 9 \\ 19 \\ \hline \end{array}$	23. $\begin{array}{r} 58 \\ 19 \\ 20 \\ \hline \end{array}$	24. $\begin{array}{r} 8 \\ 44 \\ 9 \\ \hline \end{array}$	25. $\begin{array}{r} 31 \\ 17 \\ 9 \\ \hline \end{array}$
---	--	---	---	--

26. $\begin{array}{r} 46 \text{ shrubs} \\ 19 \text{ shrubs} \\ \hline \text{shrubs} \end{array}$	27. $\begin{array}{r} 38 \text{ pinks} \\ 45 \text{ pinks} \\ \hline \text{pinks} \end{array}$	28. $\begin{array}{r} 24 \text{ daisies} \\ 67 \text{ daisies} \\ \hline \text{daisies} \end{array}$	29. $\begin{array}{r} 36 \text{ trees} \\ 54 \text{ trees} \\ \hline \text{trees} \end{array}$
---	--	--	--

30.	31.	32.	33.
38 carts	42 boats	79 ships	47 wagons
<u>39 carts</u>	<u>48 boats</u>	<u>11 ships</u>	<u>39 wagons</u>
34.	35.	36.	37.
19 rugs	46 lamps	21 chairs	14 tables
39 rugs	8 lamps	15 chairs	17 tables
<u>7 rugs</u>	<u>9 lamps</u>	<u>28 chairs</u>	<u>64 tables</u>

54. Exercise :

1. Last month I attended school 18 days and this month 19 days; how many days did I attend in both months?

2. A gardener planted 24 rows of cabbages and 18 rows of celery; how many rows of both did he plant?

3. A conductor collected 46 fares on one trip and 55 on another; how many did he collect on both trips?

4. Last week William earned 25 cents running errands, and this week 48 cents; how much did he earn both weeks?

5. Father hauled to the barn 34 loads of hay from one field and 37 from another; how many did he haul from both fields?

6. A boy had 48 pigeons and bought 24 more; how many had he then?

7. 46 boys and 48 girls in the first grade are how many children in that grade?

8. Two strings of beads, one with 48 beads the other with 36, will make one string of how many beads?

9. A farmer sold in one day 36 turkeys, 28 chickens, and 12 guinea hens; how many fowls did he sell that day?

10. How many head of live stock has a farmer if he has 14 horses, 36 cows, and 28 sheep?

SUBTRACTION

Numbers Involved, Less than 100; the Lower Number in Each Column, Less than the Upper

55. Subtract 25 from 68.

$$\begin{array}{r} 68 \\ 25 \\ \hline 43 \end{array}$$
 5 units from 8 units leaves 3 units.
 2 tens from 6 tens leaves 4 tens.
 The difference is 43.
In practice say: 5 from 8 leaves 3; 2 from 6 leaves 4.
Check: $43 + 25 = 68$.

56. Exercise:

Copy, subtract, and check:

1. $\begin{array}{r} 57 \\ 35 \\ \hline \end{array}$	2. $\begin{array}{r} 61 \\ 20 \\ \hline \end{array}$	3. $\begin{array}{r} 39 \\ 24 \\ \hline \end{array}$	4. $\begin{array}{r} 88 \\ 63 \\ \hline \end{array}$	5. $\begin{array}{r} 67 \\ 15 \\ \hline \end{array}$
6. $\begin{array}{r} 62 \\ 30 \\ \hline \end{array}$	7. $\begin{array}{r} 99 \\ 25 \\ \hline \end{array}$	8. $\begin{array}{r} 74 \\ 42 \\ \hline \end{array}$	9. $\begin{array}{r} 87 \\ 55 \\ \hline \end{array}$	10. $\begin{array}{r} 59 \\ 45 \\ \hline \end{array}$
11. $\begin{array}{r} 88 \\ 56 \\ \hline \end{array}$	12. $\begin{array}{r} 87 \\ 52 \\ \hline \end{array}$	13. $\begin{array}{r} 99 \\ 18 \\ \hline \end{array}$	14. $\begin{array}{r} 87 \\ 30 \\ \hline \end{array}$	15. $\begin{array}{r} 89 \\ 17 \\ \hline \end{array}$

16. 92 <u>40</u>	17. 56 <u>14</u>	18. 43 <u>32</u>	19. 55 <u>20</u>	20. 88 <u>52</u>
21. 56 buds 32 buds <u> </u> buds	22. 47 leaves 13 leaves <u> </u> leaves	23. 68 roses 43 roses <u> </u> roses	24. 58 violets 24 violets <u> </u> violets	
25. 76 robins 32 robins <u> </u>	26. 48 sparrows 13 sparrows <u> </u>	27. 56 crows 25 crows <u> </u>	28. 49 doves 33 doves <u> </u>	

29. Eleanor wishes to save 25 cents; if she has already saved 14 cents, how much more must she save?

30. A man bought 48 shad; how many had he left after he had sold 26 of them?

31. A farmer took to market 75 boxes of berries; if he sold all but 12 boxes, how many did he sell?

32. My vacation lasts 84 days; if 52 of them have passed, how many remain?

33. Ten of a farmer's 24 cows are in a stable, and the others in the field; how many are in the field?

34. In a school of 48 children, 22 of them are boys; how many are girls?

35. I had 78 cents and spent 25 cents for a kite; how much then had I left?

Numbers Involved, Less than 100; the Lower Number in Units' Column more than the Upper

57. Exercise :

Subtract 27 from 63.

7 units cannot be taken from 3 units.

Take 1 ten from the 6 tens, leaving 5 tens.

Add this 1 ten, or 10 units, to 3 units, making 13 units.

7 units from 13 units leaves 6 units.

2 tens from 5 tens leaves 3 tens.

The difference is 36.

In practice say: 7 from 13 leaves 6; 2 from 5 leaves 3.

Check: $36 + 27 = 63$.

$$\begin{array}{r} 63 \\ - 27 \\ \hline 36 \end{array}$$

58. Exercise :

Copy, subtract, and check :

1. $\begin{array}{r} 32 \\ - 17 \\ \hline \end{array}$	2. $\begin{array}{r} 41 \\ - 25 \\ \hline \end{array}$	3. $\begin{array}{r} 56 \\ - 38 \\ \hline \end{array}$	4. $\begin{array}{r} 82 \\ - 18 \\ \hline \end{array}$	5. $\begin{array}{r} 45 \\ - 29 \\ \hline \end{array}$
--	--	--	--	--

6. $\begin{array}{r} 42 \\ - 29 \\ \hline \end{array}$	7. $\begin{array}{r} 74 \\ - 36 \\ \hline \end{array}$	8. $\begin{array}{r} 62 \\ - 19 \\ \hline \end{array}$	9. $\begin{array}{r} 27 \\ - 18 \\ \hline \end{array}$	10. $\begin{array}{r} 43 \\ - 19 \\ \hline \end{array}$
--	--	--	--	---

11. $\begin{array}{r} 77 \\ - 58 \\ \hline \end{array}$	12. $\begin{array}{r} 93 \\ - 84 \\ \hline \end{array}$	13. $\begin{array}{r} 50 \\ - 41 \\ \hline \end{array}$	14. $\begin{array}{r} 70 \\ - 36 \\ \hline \end{array}$	15. $\begin{array}{r} 32 \\ - 27 \\ \hline \end{array}$
---	---	---	---	---

16. $\begin{array}{r} 81 \\ - 29 \\ \hline \end{array}$	17. $\begin{array}{r} 60 \\ - 18 \\ \hline \end{array}$	18. $\begin{array}{r} 35 \\ - 27 \\ \hline \end{array}$	19. $\begin{array}{r} 48 \\ - 39 \\ \hline \end{array}$	20. $\begin{array}{r} 77 \\ - 29 \\ \hline \end{array}$
---	---	---	---	---

21. $\begin{array}{r} 40 \text{ cows} \\ 12 \text{ cows} \\ \hline \text{cows} \end{array}$	22. $\begin{array}{r} 46 \text{ lambs} \\ 28 \text{ lambs} \\ \hline \text{lambs} \end{array}$	23. $\begin{array}{r} 72 \text{ sheep} \\ 33 \text{ sheep} \\ \hline \text{sheep} \end{array}$	24. $\begin{array}{r} 58 \text{ horses} \\ 29 \text{ horses} \\ \hline \text{horses} \end{array}$
---	--	--	---

25.	26.	27.	28.
60 posts	52 boards	61 rails	80 logs
<u>37 posts</u>	<u>28 boards</u>	<u>27 rails</u>	<u>51 logs</u>

29. Frank has 26 tin soldiers and George has 17; how many more has Frank than George?

30. A boy is 17 years old and his father is 41 years old; how much older is the father than the boy?

31. Grace wrote 31 words. She erased 12 of them; how many were left?

32. A boy that weighs 68 pounds must gain how many pounds to weigh 85 pounds?

33. On one shelf there are 51 books and on another 29; how many more are there on the one than on the other?

34. A farmer planted 48 fruit trees; if 39 of them grew and the rest died, how many of them died?

35. My album holds 50 pictures; if I have 18 pictures in it, how many are needed to fill it?

REVIEW

59. Exercise :

The number 756 is here written in two ways :

$$756 = 7 \text{ hundreds} + 5 \text{ tens} + 6 \text{ units.}$$

1. Write 842 in two ways; 428; 284; 986.

2. Add rapidly :

20	40	20	30	40	40	50
<u>30</u>	<u>50</u>	<u>70</u>	<u>30</u>	<u>40</u>	<u>30</u>	<u>20</u>

3. Start at 1 and count by twos to 35.

4. Count by 5's to 50; count by 5's from 50 to 0.

5. Write all the numbers of two figures that end in 4; add rapidly 9 to each.

6. Add around the ring until the sum is 50.



7. Start at each number and add twice around the ring.



8. Find the sum of all numbers less than 10.

9. Write all the numbers of two figures each that end in 1; subtract at sight 9 from each of them.

10. Subtract rapidly from 50 the numbers around the ring one after another; continue until the result is 0.



11. Start at 37 and count backwards by 2's to 1. Start at 2 and count by 3's to 32; then count backwards by 3's from 32 to 2.

12. Start at 60 and subtract rapidly the numbers around the ring one after another; continue until the result is 0.



13. Count by tens to 100; then count backwards to 0.

14. Two dimes and a V-cent piece are worth how many cents?

15. For what number does I stand? V? X?

16. Name the answers as soon as the teacher has read:

$$5 + 4 - 3 + 2 + 5; \quad 7 + 6 - 5 - 2 + 3.$$

17. 2 dimes, a nickel, and a cent are worth how many cents?

18. I have 3 pieces of money in my pocket that are together worth 16 cents; what are they?

19. How much change should a boy have after he has paid for a 5-cent ball, a 3-cent top, and a 4-cent toy rabbit, if he gave in payment a dime and a nickel?

20. Start at 5 and count by 10's to 95; then count back by tens from 95 to 5.

21. How much greater is 100 than the sum of 32 and 48?

22. Add upward; add across:

$$1 + 2 + 3 = ?$$

$$7 + 6 + 8 + 9 = ?$$

$$5 + 2 + 4 = ?$$

$$3 + 4 + 7 + 8 = ?$$

$$\frac{3 + 3 + 1 = ?}{? + ? + ? = ?}$$

$$\frac{5 + 9 + 6 + 7 = ?}{? + ? + ? + ? = ?}$$

$$? + ? + ? = ?$$

$$? + ? + ? + ? = ?$$

23. Add upward; subtract across:

$$17 - 9 = ?$$

$$25 - 12 = ?$$

$$18 - 9 = ?$$

$$36 - 14 = ?$$

$$\frac{12 - 8 = ?}{? - ? = ?}$$

$$\frac{31 - 17 = ?}{? - ? = ?}$$

$$? - ? = ?$$

$$? - ? = ?$$

24. How much change should a boy receive from a 50-cent piece that he gives in payment for a 25-cent knife, a 10-cent ball, and a 5-cent pencil?

MULTIPLICATION AND DIVISION

Multiplying by 2

60. 3 plums + 3 plums are 2 times 3 plums.
 61. *2 times 3 plums* may be written 2×3 *plums*.
 62. The sign $\times$ stands for **times**.
 63. Exercise :

1 + 1	2 + 2	3 + 3	4 + 4
2×1	2×2	2×3	2×4

1. How many are $1 + 1$? How many are 2×1 ?
2. How many are $2 + 2$? How many are 2×2 ?
3. How many are $3 + 3$? 2×3 ?
4. How many are $4 + 4$? 2×4 ?
5. Show by lines 2×5 ; 2×6 ; 2×7 ; 2×8 ; 2×9 ;
 2×10 .
6. How many are 2×5 ? 2×6 ? 2×7 ? 2×8 ? 2×9 ?
 2×10 ?

64.

Table

$2 \times 1 = 2$	$2 \times 6 = 12$
$2 \times 2 = 4$	$2 \times 7 = 14$
$2 \times 3 = 6$	$2 \times 8 = 16$
$2 \times 4 = 8$	$2 \times 9 = 18$
$2 \times 5 = 10$	$2 \times 10 = 20$

TO THE TEACHER. Have pupils build up this table from the preceding exercise; then drill them upon it until they remember it.

65. Exercise :

1. How many are :

two 3's? two 5's? two 4's? two 2's? two 6's?
two 7's? two 9's? two 8's? two 10's?

2. What do 2 one-cent stamps cost?

3. What do 2 two-cent stamps cost?

4. Find the cost of :

2 tablets at 6 cents each.

2 lemons at 3 cents each.

2 pencils at 5 cents each.

5. Two dimes are worth how many cents?

6. How many shoes make a **pair**?

7. How many pigeons are there in 2 pairs?

8. How many horses will make 2 six-horse teams?

9. How many days are there in 2 weeks?

10. How many wheels have two wagons?

11. What piece of money will pay for 2 five-cent car-fares?

12. How many trees are there in 2 rows, 8 in each **row**?

13. I have a nickel and 4 cents in each hand; how **much** money have I in both?

14. How much must I pay for 2 ten-cent picture books?

Multiplying by 3

66. Exercise :

1. Copy and add :

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>

2. From the sums in Example 1, tell how many are:

three 1's; three 2's; three 3's; three 4's; three 5's;
 three 6's; three 7's; three 8's; three 9's; three 10's.

67.

Table

$3 \times 1 = 3$	$3 \times 6 = 18$
$3 \times 2 = 6$	$3 \times 7 = 21$
$3 \times 3 = 9$	$3 \times 8 = 24$
$3 \times 4 = 12$	$3 \times 9 = 27$
$3 \times 5 = 15$	$3 \times 10 = 30$

68. Exercise :

1. How many are:

three 6's? three 8's? three 4's? three 1's? three 5's?

2. How many are:

three 3's? three 7's? three 2's? three 9's? three 10's?

3. What do 3 two-cent stamps cost?

4. How many wheels have 3 automobiles?

5. How many seeds have 3 peaches?

6. 3 dimes are worth how many cents?

7. 3 nickels are worth how many cents?
8. How many days are there in 3 weeks?
9. 3 hens with 10 chicks each have how many chicks?
10. 3 rows of fruit jars, 9 in a row, are how many fruit jars?
11. In 3 four-horse teams there are how many horses?
12. How many pigeons are needed to make 3 pairs?
13. A passenger car has 8 wheels; three passenger cars have how many wheels?
14. Mary wrote this little note to Jane: "*Come home soon.*"

How many words are there in this note?

How many letters are there in each word?

How many letters are there in the note?

Dividing by 2

69. 1. How many strokes are there on this line? ||| |||
2. How many groups, or *parts*, are made of these strokes?
3. See that the parts are alike by counting the strokes in each part.
70. Parts that are alike are said to be equal.
1. Draw strokes to show the two equal parts of 2; 4; 8; 10.
 2. Name one of the two equal parts of 2; 4; 6; 8.

71. Each of the two equal parts of a number is called one half of it.

72. One half is written $\frac{1}{2}$.

73. Exercise:

1. What is $\frac{1}{2}$ of 2? What is $\frac{1}{2}$ of 4? What is $\frac{1}{2}$ of 6? What is $\frac{1}{2}$ of 8?

2. Make 6 dots; rub out $\frac{1}{2}$ of them.

3. Hold up 8 fingers; close half of them.

4. Count halfway to ten.

5. $\frac{1}{2}$ of 10 cents is worth what piece of money?

6. I have 20 one-cent pieces; what piece of money could I get for half of them?

7. Count the strokes on this line. || || ||

How many strokes are there in each group? How many groups are there?

8. Show by strokes how many 2's there are in 4; in 8; in 10; in 12.

9. How many 2's are there in 14? in 16? in 18? in 20?

10. How many 2-cent stamps can be bought for 8 cents?

11. 10 children will make how many groups of 2 children each?

Dividing by 3

74. Here are 12 dots in 3 equal groups:

• • • • • • • • • • • •

75. Each of the three equal parts of a number is called one third of it.

76. One third is written $\frac{1}{3}$.

77. Exercise:

1. Find by using drawings or objects:

$\frac{1}{3}$ of 3. $\frac{1}{3}$ of 6. $\frac{1}{3}$ of 9. $\frac{1}{3}$ of 12. $\frac{1}{3}$ of 15.

2. Score 15 thus: . Rub out $\frac{1}{3}$ of 15 strokes.

3. A teacher has 18 children in 3 classes, in each class the same number; how many has she in each class?

4. If a dozen cans are placed in 3 rows, with the same number in each row, how many are there in each row?

5. I planted 24 tomato plants in 3 rows, the same number in each; how many did I plant in each row?

6. I had 30 cents and exchanged $\frac{1}{3}$ of it for a piece of money; what piece?

7. Count the strokes on this line. 

How many strokes are there in each group? How many groups are there?

8. Find out how many 3's there are in 9; in 12; in 15; in 18.

9. How many 3's are there in 21? in 24? in 27? in 30?

10. How many groups of 3 apples each can be made with 9 apples?

11. A dozen buttons are sewed on a card in rows, 3 buttons in each row; how many rows are there?

12. I have 6 sticks of candy; to how many children can I give 3 sticks each?

Multiplying by 4

78. Exercise:

1. Copy and add:

1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>

2. From the sums in Example 1, tell how many are:

four 1's; four 2's; four 3's; four 4's; four 5's;
four 6's; four 7's; four 8's; four 9's; four 10's.

79.

Table

$4 \times 1 = 4$	$4 \times 6 = 24$
$4 \times 2 = 8$	$4 \times 7 = 28$
$4 \times 3 = 12$	$4 \times 8 = 32$
$4 \times 4 = 16$	$4 \times 9 = 36$
$4 \times 5 = 20$	$4 \times 10 = 40$

80. Exercise :

1. How many are :

four 2's? four 9's? four 6's? four 1's? four 5's?
 four 8's? four 10's? four 4's? four 7's? four 3's?

2. 4 three-cent rulers cost how many cents?

3. In 4 weeks there are how many days?

4. Find the cost of 4 five-cent tablets.

5. How many buttons are on a card of 4 rows of buttons, 6 buttons to a row?

6. Find how much must be paid for all :

4 one-cent postal cards.

4 five-cent postage stamps.

4 two-cent postage stamps.

7. Find the cost of all :

4 one-cent papers.

4 four-cent spools of thread.

4 five-cent bars of soap.

4 eight-cent coat hooks.

Multiplying by 5**81. Exercise :**

1. Copy and add :

1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10

2. From the sums in Example 1 tell how many are:
- | | | | | |
|-----------|-----------|-----------|-----------|------------|
| five 1's; | five 2's; | five 3's; | five 4's; | five 5's; |
| five 6's; | five 7's; | five 8's; | five 9's; | five 10's. |

82.

Table

$5 \times 1 = 5$	$5 \times 6 = 30$
$5 \times 2 = 10$	$5 \times 7 = 35$
$5 \times 3 = 15$	$5 \times 8 = 40$
$5 \times 4 = 20$	$5 \times 9 = 45$
$5 \times 5 = 25$	$5 \times 10 = 50$

83. Exercise :

1. How many are :

- | | | | | |
|-----------|-----------|-----------|-----------|------------|
| five 3's? | five 4's? | five 2's? | five 6's? | five 9's? |
| five 5's? | five 8's? | five 1's? | five 7's? | five 10's? |

2. How many horses are needed to make 5 four-horse teams?

3. 5 packages of pencils, 6 pencils to the package, are how many pencils?

4. 5 dimes are worth how many cents?

5. 5 nickels are worth how many one-cent pieces?

Find the cost of :

6. 5 pairs of shoe laces at 10 cents a pair.

7. 5 pounds of rice at 8 cents a pound.

8. 5 loaves of bread at 6 cents each.

Dividing by 4

84. How many strokes are here? 
How many equal groups? how many strokes in each group?

85. Each of the four equal parts of a number is called one fourth of it.

86. One fourth is written $\frac{1}{4}$.

87. Exercise :

1. Find by using drawings or objects (if necessary) :

$\frac{1}{4}$ of 20; $\frac{1}{4}$ of 12; $\frac{1}{4}$ of 16; $\frac{1}{4}$ of 24;

$\frac{1}{4}$ of 40; $\frac{1}{4}$ of 28; $\frac{1}{4}$ of 32; $\frac{1}{4}$ of 36.

2. Score 20 thus: 

Rub out $\frac{1}{4}$ of 20 strokes.

3. I spent 8 cents for 4 apples; how much was that for each?

4. If 24 pencils are divided into 4 equal bunches, how many pencils are there in each bunch?

5. If 12 oranges are put in 4 equal groups, how many oranges are there in a group?

6. Count the rings shown here. How many 
are there in one group? How many groups are 
there? How many 4's are there in 12? 

7. Find out how many 4's there are in 8; in 16.

8. 20 cents will buy how many tops at 4 cents each?

9. At 4 cents each, how many packages of needles can be bought for 24 cents?

10. A woman spent 40 cents for 4 handkerchiefs; she paid the same price for each. How much did she pay for each?

Dividing by 5

88. 1. How many groups of dots are here?

• • • • • • • • • • • • • • •

2. Count the number of dots in each group to see that the groups are equal.

89. Each of the five equal parts of a number is called one fifth of it.

90. One fifth is written $\frac{1}{5}$.

91. Exercise:

1. Find by using drawings or objects (if necessary):

$\frac{1}{5}$ of 10; $\frac{1}{5}$ of 20; $\frac{1}{5}$ of 30; $\frac{1}{5}$ of 40;

$\frac{1}{5}$ of 50; $\frac{1}{5}$ of 25; $\frac{1}{5}$ of 35; $\frac{1}{5}$ of 45.

2. Score 25 thus:

|||| |||| |||| |||| ||||

Rub out $\frac{1}{5}$ of 25 strokes.

3. $\frac{1}{5}$ of 10 cents equals how many cents?

4. 5 boys shared 30 firecrackers equally; how many did each receive?

5. Look at Example 2 and count the 5's in 25.

6. Show how many 5's there are in 15.
7. 30 cents will pay the fares on a trolley car for how many persons, if the fare for each person is 5 cents?
8. 25 one-cent pieces are worth how many nickels?
9. If 30 stalks of celery are put up in 5 equal bunches, how many stalks are there in 1 bunch?

LIQUID MEASURES

92. Tell which of these flow like water:

milk; snow; oil; coal; vinegar; sirup; potatoes.

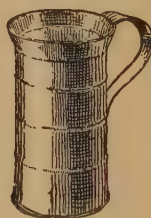
Many things that flow like water are sold by these measures:



1 pint



1 quart



1 gallon

93. Learn by measuring that:

2 pints (pt.)	= 1 quart (qt.)
4 quarts	= 1 gallon (gal.)

94. Exercise:

1. How many pints are there in a quart? How many quarts are there in a gallon?

2. Find the cost of 2 qt. milk at 7 cents a quart.
3. Find the cost of 4 qt. vinegar at 5 cents a quart.
4. Find the cost of all :

1 pt. cream, 10 cents.

1 qt. milk, 6 cents.

1 qt. vinegar, 5 cents.

5. A quart of cream will fill how many pint bottles?
6. A gallon of milk will fill how many quart bottles?
7. A quart and a pint of cream will fill how many pint bottles?

Fill in the missing numbers :

8. 2 qt. + 3 qt. = ——— qt.
9. 4 gal. + 2 gal. = ——— gal.
10. 8 gal. - 2 gal. = ——— gal.
11. 2 qt. + 3 qt. + 3 qt. = ——— qt., or ——— gal.
12. 5 qt. + 3 qt. = ——— qt., or ——— gal.
13. 2 pt. + 4 pt. = ——— pt., or ——— qt.

DRY MEASURES

95. The things that are measured by these measures do not flow like water :



1 pint



1 quart



1 peck



1 bushel

1. Name three things that are sold by the bushel.
2. Name three things that are sold by the peck.
3. Which of the following could you buy by the quart?
by the pint?

Strawberries; potatoes; cherries; peanuts; turnips;
raspberries; ribbon; coffee; plums; apples; beans;
chestnuts; tomatoes.

96. Learn by measuring that:

2 pints (pt.)	= 1 quart (qt.)
8 quarts	= 1 peck (pk.)
4 pecks	= 1 bushel (bu.)

TO THE TEACHER. When possible have pupils see Liquid Measures and Dry Measures put to practical use.

97. Exercise:

1. Find the cost of all:

1 pt. lima beans, 8 cents.

1 qt. blackberries, 6 cents.

1 qt. plums, 8 cents.

Read, supplying the missing numbers:

2. 2 quarts of berries will fill —— pint boxes.
3. 2 pk. = —— quarts.
4. 4 qt. = —— pints.
5. 3 bu. = —— pecks.

6. A 2-bushel box will hold how many pecks of apples?

7. A 3-bushel bag will hold how many pecks of grass seed?

Copy and fill in the missing numbers:

8. 8 pk. will make — bu.

9. 5 qt. + 3 qt. = — qt., or — pk.

10. 4 pk. + 3 pk. + 1 pk. = — pk., or — bu.

11. 8 pk. - 2 pk. = — pk.

12. 10 bu. - 4 bu. = — bu.

MEASURES OF LENGTH

98. Exercise:

1. How many lines are here?

2. Point to the first; to the third; to the second.

3. Which is the shortest? the longest?

4. How many are longer than the first? How many are shorter than the third?

5. Draw a line shorter than the first; longer than the third.

6. This line is 1 inch long. _____

7. With a string 1 inch long measure this line :



8. How many inches long is this ruler ?



9. Make a ruler 6 inches long out of cardboard and mark it off in inches.

10. Draw a line 2 inches long ; 3 inches ; 6 inches.

11. Draw on the blackboard a line 9 inches long ; 12 inches long.

$$12 \text{ inches (in.)} = 1 \text{ foot (ft.)}$$

12. Make a ruler 1 foot long and mark it off in inches.

13. Draw on the blackboard a line a foot long.

14. Draw a long line on the blackboard and mark off on it 1 foot ; 2 feet ; 3 feet.

15. Measure a yardstick with a foot ruler.

$$3 \text{ feet (ft.)} = 1 \text{ yard (yd.)}$$

16. How many feet are there in 2 yards ? 3 yards ? 4 yards ? 5 yards ?

17. 3 in. + 6 in. are how many inches ?

Read Examples 18, 19, 20, and 21, supplying the missing numbers :

18. 9 in. + 3 in. = — in., or — ft.

19. In 2 ft. there are — in.

20. 9 in. - 3 in. = — in.
21. 6 in. + 6 in. = — in., or — ft.
22. How many yards are there in 6 ft.?
23. How many yards are there in 9 ft.?
24. How many yards are there in 12 ft.? 15 ft.?

Purchases by the Yard

99. Exercise :

1. Make a list of 5 articles that we buy by the yard.

Some Market Prices

(Use in this Exercise.)

Gingham	8 cents a yard
Ribbon	4 cents a yard
Muslin	7 cents a yard
Lace	6 cents a yard
Lining	9 cents a yard

2. What do 2 yards of gingham cost?
3. Sara bought a yard of ribbon and a yard of lace.
How much did they cost?
4. Helen bought a yard of ribbon and a yard of muslin.
What did they cost?
5. What 3 pieces of money will pay for a yard of lining
and a yard of muslin?
6. Anna bought a yard of gingham, a yard of ribbon,
and a yard of lace. She gave in payment 2 dimes. How
much change should she get?

7. What 2 pieces of money will pay for a yard of lining and a yard of lace?

8. What would 2 yards of ribbon and a yard of lace cost?

9. What would 3 yards of muslin cost? 4 yards of lace? 5 yards of lining?

ROMAN NOTATION — TELLING TIME

100. 1. Sometimes letters are used to write numbers; then,

I = 1

V = 5

X = 10

2. The first 12 numbers are written :

I	II	III	IV or IIII	V	VI
1	2	3	4	5	6
VII	VIII	IX	X	XI	XII
7	8	9	10	11	12

3. Notice that

I = 1

VII = 5 + 2

II = 1 + 1

VIII = 5 + 3

III = 1 + 1 + 1

IX = 1 from 10

IV = 1 from 5

X = 10

IIII = 1 + 1 + 1 + 1

XI = 10 + 1

V = 5

XII = 10 + 2

VI = 5 + 1

These letters are often found on the faces of clocks.

101. 1. On a clock that has two hands, the long hand is called the **minute hand** and the short hand, the **hour hand**.

2. When the minute hand points to XII, the hour hand tells the hour.

3. The time by this clock is 7 o'clock.



4. What is the time when the minute hand points to XII and the hour hand points to :

I? V? X? II? III? VI? IX? IIII? XI? XII? VIII?

5. Count the numbers around the clock face starting at I; how many are there?

6. How many are $\frac{1}{2}$ of them? $\frac{1}{4}$ of them?

7. Counting to the right what is the sixth number from XII?

8. To what does the minute hand point at 7 o'clock? the hour hand?

9. On this clock the minute hand has moved from XII to VI; and the hour hand is between VII and VIII. The time shown is *half past 7* o'clock.



10. Counting to the right what is the third number from XII? What part of all the numbers did you count?

11. On this clock the minute hand has moved from XII to III; and the hour hand is between VII and VIII. The time shown is *a quarter past 7 o'clock*.



12. Counting to the left what is the third number from XII?

13. On this clock the minute hand has moved to the right from XII to IX, and the hour hand is between VII and VIII. The time shown is *a quarter of 8 o'clock*.



14. Tell where the minute hand and the hour hand are pointing when the time is: half past three; a quarter past five; a quarter of two; a quarter past nine.

15. Draw clock faces with the hands showing: half past one; a quarter past nine; a quarter of eleven.

REVIEW

102. Exercise :

Read, naming the answer to each at sight:

1. 2×6	3×5	4×3	2×7	4×10
2. 4×6	5×2	4×4	3×3	5×10
3. 3×6	2×8	5×4	4×7	2×10
4. 5×6	2×9	3×4	5×3	3×10
5. 5×7	5×9	3×7	3×9	3×8
6. 5×8	5×5	4×8	4×5	4×9

7. $\frac{1}{2}$ of 4	$\frac{1}{2}$ of 14	$\frac{1}{3}$ of 12	$\frac{1}{4}$ of 20	$\frac{1}{2}$ of 20
8. $\frac{1}{4}$ of 8	$\frac{1}{5}$ of 10	$\frac{1}{2}$ of 6	$\frac{1}{2}$ of 12	$\frac{1}{4}$ of 40
9. $\frac{1}{2}$ of 8	$\frac{1}{3}$ of 6	$\frac{1}{2}$ of 10	$\frac{1}{5}$ of 20	$\frac{1}{3}$ of 30

Name the number for which each stands:

10. I IV VI VIII IX II

11. X XII VII III XI V

Read Examples 12 and 13, supplying the missing numbers:

12. 1 qt. = — pt. 1 gal. = — qt. 1 bu. = — pk.

13. 1 pk. = — qt. 1 yd. = — ft. $\frac{1}{2}$ ft. = — in.

14. A gallon bucket that has in it 3 qt. of water will hold how many more quarts?

15. I was sent to the store for a 5-cent spool of thread, two 5-cent loaves of bread, and a 2-cent box of matches; how much change should I bring back out of a dime, and two 5-cent pieces?

16. At four for 1 cent how many marbles can be bought for 2 cents?

17. Find the amount of Sara's bill if she made these purchases:

2 bolts of tape, 4 cents each.

1 spool of thread, 5 cents.

1 paper of pins, 5 cents.

2 yards of muslin, 8 cents a yard.

CHAPTER II

READING AND WRITING NUMBERS TO 9999

1. Exercise — Review :

1. Count 10 ; count from 20 to 30 ; from 50 to 70.
2. Write in figures all numbers that can be written each with one figure.
3. Count by tens from 10 to 90 ; from 90 to 10.
4. Write in figures the tens. Thus, 10, 20, and so on.

Name and write in figures the numbers from:

5. 10 to 20 6. 20 to 30 7. 30 to 40 8. 40 to 50
9. 50 to 60 10. 60 to 70 11. 70 to 80 12. 80 to 90
13. In a number of two figures what is the right-hand figure called? the left-hand figure?

Read :

- | | | | | | | |
|-----|----|----|----|----|----|----|
| 14. | 15 | 28 | 76 | 40 | 32 | 97 |
| 15. | 81 | 68 | 55 | 79 | 19 | 25 |
| 16. | 90 | 44 | 99 | 87 | 38 | 85 |
17. Ten tens make what number ?
 18. Count by hundreds to 900 ; from 900 to 100.
 19. Write in figures the hundreds.

Count by tens from :

- | | | |
|----------------|----------------|----------------|
| 20. 100 to 200 | 21. 200 to 300 | 22. 300 to 400 |
| 23. 400 to 500 | 24. 500 to 600 | 25. 600 to 700 |
| 26. 700 to 800 | 27. 800 to 900 | 28. 200 to 100 |

Name and write in figures the numbers between :

- | | | |
|-----------------|-----------------|-----------------|
| 29. 230 and 240 | 30. 360 and 370 | 31. 510 and 520 |
| 32. 740 and 750 | 33. 880 and 890 | 34. 910 and 920 |

Tell for what each figure in these numbers stands :

35. 820 36. 906 37. 123 38. 321 39. 231
 40. In numbers of three figures what is the first figure, counting from the right, called ? the second ? the third ?

2. Exercise — Review :

1. Read across ; read down :

123	713	983	990
231	900	398	706
321	999	837	401
101	456	645	564

2. Write in figures the number made up of 6 hundreds, 5 tens, and 2 units ; 4 hundreds, 9 tens, and 5 units.

3. Write in figures the number made up of 9 hundreds, 1 ten, and 1 unit ; 7 hundreds and 6 tens.

4. Write in figures the number made up of 8 hundreds and 4 units ; 3 hundreds and 3 tens.

Supply the missing numbers :

5. $275 = \text{--- hundreds, --- tens, and --- units.}$
6. $408 = \text{--- hundreds, --- tens, and --- units.}$
7. $360 = \text{--- hundreds, --- tens, and --- units.}$
8. $1 \text{ ten} = \text{--- ones; } 2 \text{ tens} = \text{--- ones.}$
9. $1 \text{ hundred} = \text{--- tens; } 3 \text{ hundreds} = \text{--- tens.}$
10. $2 \text{ tens and } 5 \text{ units} = \text{--- units.}$
11. $4 \text{ hundreds and } 6 \text{ tens} = \text{--- tens.}$
12. $20 \text{ units} = \text{--- tens; } 50 \text{ units} = \text{--- tens.}$
13. $25 \text{ units} = \text{--- tens and --- units (take out as many tens as possible).}$
14. $46 \text{ tens} = \text{--- hundreds and --- tens.}$

3. Ten hundreds make **one thousand**, written **1000**, which means **one thousand, no hundreds, no tens, and no units.**

1. Write in figures :

two thousand; three thousand; four thousand;
five thousand; six thousand; seven thousand;
eight thousand; nine thousand.

4. One thousand and one make **one thousand one**, written **1001**, which means **one thousand, no hundreds, no tens, and one unit.**

1. Name and write in figures the numbers formed by uniting the following with one thousand :

two; three; four; five; six; seven; eight; nine.

5. One thousand and ten make **one thousand ten**, written **1010**, which means **one** thousand, **no** hundreds, **one** ten, and **no** units.

1. Write in figures:

one thousand twenty;	one thousand thirty;
one thousand forty;	one thousand fifty;
one thousand sixty;	one thousand seventy;
one thousand eighty;	one thousand ninety.

2. Name and write the numbers between:

1010 and 1020; 1040 and 1050; 1080 and 1090.

6. One thousand and one hundred make **one thousand one hundred**, written **1100**, which means **one** thousand, **one** hundred, **no** tens, and **no** units.

Read:

1200; 1300; 1400; 1500; 1600; 1700; 1800; 1900.

7. Exercise:

Write in figures:

1. two thousand one; two thousand ten.
2. two thousand eleven; two thousand fifty-two.
3. two thousand one hundred; two thousand one hundred ten.
4. two thousand three hundred twenty; two thousand three hundred twenty-six.
5. three thousand forty-five; three thousand seven hundred.

6. four thousand six hundred twenty; five thousand six hundred sixteen.

7. six thousand six; seven thousand eight hundred four.

8. eight thousand ninety; eight thousand seven hundred seventy.

9. nine thousand nine hundred; nine thousand nine hundred ninety-nine.

Read:

10. 2000	11. 9000	12. 3003	13. 4044
14. 5010	15. 5021	16. 5111	17. 7020
18. 1701	19. 9090	20. 5767	21. 8001

ADDITION AND SUBTRACTION

The Forty-Five Elementary Sums

8. Exercise — Review:

Name the answer at sight:

1. Add 1 to

3 5 1 6 9 2 7 4 8

Answer thus: 4, 6, 2, and so on.

2. Add 2 to

4 6 7 2 9 3 8 5

3. Add 3 to

3 9 6 8 4 7 5

4. Add 4 to

7 6 9 5 8 4

5. Add 5 to

8 5 6 9 7

6. Add 6 to

9 7 6 8

7. Add 7 to

7 9 8

8. Add 8 to

9 8

9. Add 9 to

9

Eighty Important Elementary Differences

9. Exercise — Review :

Subtract rapidly :

1. 2 from

2 4 3 6 9 5 8 10 7 11

Answer thus : 0, 2, 1, 4, and so on.

2. 3 from

3 6 4 9 5 8 12 10 7 11

3. 4 from

7 5 6 4 12 8 11 9 13 10

4. 5 from

8 5 6 12 14 11 9 13 10 7

5. 6 from

8 10 6 9 12 7 14 11 13 15

6. 7 from

8 10 9 7 12 14 11 16 13 15

7. 8 from

10 12 14 16 8 9 11 13 15 17

8. 9 from

11 13 9 12 16 10 14 17 15 18

ADDITION

A Number of One Figure to a Number of Two Figures; Sum
of the Units, Less than Ten

10. Exercise:

Add rapidly:

1. Each of the numbers 2, 5, 3, 6, 4, 7, 9, 8 to

10 20 30 40 50 60 70 80 90

Name results only. Thus, 12, 15, 13, and so on; then, 22, 25, 23,
and so on; etc.

2. Each of the numbers 2, 5, 3, 6, 4, 8, 7 to

11 21 31 41 51 61 71 81 91

3. Each of the numbers 2, 5, 3, 6, 4, 7 to

12 22 32 42 52 62 72 82 92

4. Each of the numbers 2, 5, 3, 6, 4 to

13 23 33 43 53 63 73 83 93

5. Each of the numbers 2, 5, 4, 3 to

14 24 34 44 54 64 74 84 94

6. Each of the numbers 2, 4, 3 to

15 25 35 45 55 65 75 85 95

7. Each of the numbers 3 and 2 to

16 26 36 46 56 66 76 86 96

8. 2 to

17 27 37 47 57 67 77 87 97

The Sum in any Column, Less than Ten

11. Add 324 and 543.

324 3 units and 4 units are 7 units.

543 4 tens and 2 tens are 6 tens.

867 5 hundreds and 3 hundreds are 8 hundreds.

The sum is 867.

In practice say: 3 and 4 are 7; 4 and 2 are 6; 5 and 3 are 8.

12. Exercise:

Copy and add:

$$\begin{array}{r} 1. \quad 40 \\ 18 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 30 \\ 29 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 56 \\ 40 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 65 \\ 20 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 42 \\ 11 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 56 \\ 23 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 28 \\ 31 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 43 \\ 36 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 111 \\ 222 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 336 \\ 201 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 424 \\ 342 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 235 \\ 534 \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad 387 \\ 512 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 258 \\ 741 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 340 \\ 635 \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad 326 \\ 362 \\ \hline \end{array}$$

17.	22	18.	33	19.	20	20.	14
	34		22		45		22
	<u>42</u>		<u>32</u>		<u>24</u>		<u>52</u>
21.	708	22.	321	23.	321	24.	421
	260		432		372		243
	<u>31</u>		<u>146</u>		<u>305</u>		<u>324</u>
25.	111	26.	101	27.	230	28.	242
	43		220		345		124
	203		365		13		411
	<u>42</u>		<u>12</u>		<u>11</u>		<u>212</u>

A Number of One Figure to a Number of Two Figures ; Sum of the Units, Ten or More

13. Exercise :

Add rapidly :

1. Each of the numbers 1, 2, 5, 3, 6, 4, 8, 7, 9 to

19 29 39 49 59 69 79 89 99

Name results only. Thus, 20, 21, 24, 22, and so on ; then, 30, 31, 34, and so on ; etc.

2. Each of the numbers 2, 5, 3, 6, 4, 8, 7, 9 to

18 38 58 28 48 68 88 78 98

3. Each of the numbers 5, 3, 6, 4, 8, 7, 9 to

17 37 57 27 47 67 87 77 97

4. Each of the numbers 5, 8, 6, 9, 7, 4 to

16 36 56 26 46 66 86 76 96

5. Each of the numbers 5, 8, 6, 7, 9 to

15	35	55	25	45	65	85	75	95
----	----	----	----	----	----	----	----	----

6. Each of the numbers 6, 8, 7, 9 to

14	34	54	24	44	64	84	74	94
----	----	----	----	----	----	----	----	----

7. Each of the numbers 8, 7, 9 to

13	33	53	23	43	63	83	73	93
----	----	----	----	----	----	----	----	----

8. Each of the numbers 8 and 9 to

12	32	52	22	42	62	82	72	92
----	----	----	----	----	----	----	----	----

9. 9 to

11	31	51	21	41	61	81	71	91
----	----	----	----	----	----	----	----	----

The Sum in any Column not Restricted

14. Add 456 and 278.

456 8 units and 6 units are 14 units, or 1 ten and 4 units.

278 Write four in units' place and add one to the tens.

734 1 ten, 7 tens, and 5 tens are 13 tens, or 1 hundred and 3 tens. Write 3 in tens' place and add 1 to the hundreds.

1 hundred, 2 hundreds, and 4 hundreds are 7 hundreds.

Write 7 in hundreds' place.

The sum is 734.

In practice say : 8 and 6 are 14; 1, 7, and 5 are 13; 1, 2, and 4 are 7.

15. Exercise:

Copy and add:

1. 37	2. 73	3. 47	4. 38
<u>56</u>	<u>18</u>	<u>54</u>	<u>76</u>

5. 48 <u>56</u>	6. 53 <u>67</u>	7. 77 <u>66</u>	8. 75 <u>75</u>
9. 48 <u>97</u>	10. 89 <u>76</u>	11. 79 <u>54</u>	12. 98 <u>99</u>
13. 376 <u>348</u>	14. 432 <u>269</u>	15. 725 <u>185</u>	16. 638 <u>297</u>
17. 82 20 <u>19</u>	18. 58 67 <u>38</u>	19. 27 14 <u>96</u>	20. 17 9 <u>17</u>
21. 127 346 <u>428</u>	22. 176 429 <u>416</u>	23. 386 201 <u>314</u>	24. 309 147 <u>348</u>
25. 146 127 360 <u>135</u>	26. 229 175 19 <u>9</u>	27. 117 486 7 <u>8</u>	28. 207 209 56 <u>59</u>
29. 148 258 209 <u>27</u>	30. 507 99 9 <u>826</u>	31. 468 189 90 <u>176</u>	32. 604 198 95 <u>9</u>

Add upward: add across:

$$\begin{array}{r}
 33. \quad 7+6+8=? \\
 9+9+7=? \\
 6+5+8=? \\
 \hline
 ?+?+?= ?
 \end{array}$$

$$\begin{array}{r}
 34. \quad 32+9+9=? \\
 7+11+79=? \\
 50+25+13=? \\
 \hline
 ?+?+?= ?
 \end{array}$$

$$35. \quad 48 + 34 + 46 = ?$$

$$52 + 37 + 58 = ?$$

$$\underline{36 + 18 + 31 = ?}$$

$$? + ? + ? = ?$$

$$36. \quad 55 + 12 + 7 = ?$$

$$16 + 40 + 19 = ?$$

$$\underline{99 + 19 + 98 = ?}$$

$$? + ? + ? = ?$$

16. Exercise :

1. A farmer planted an orchard of 72 apple trees, 48 peach trees, and 36 plum trees; how many did he plant in all?

72 was the number of apple trees he planted.

48 was the number of peach trees he planted.

36 was the number of plum trees he planted.

? was the number of trees he planted.

2. This year Louise attended Sunday School 22 times and Esther attended 11 more times than Louise; how many times did Esther attend?

3. A gardener set out 56 cabbage plants on Monday and 64 on Tuesday; how many did he set out on both days?

4. A man in one day sold 36 cows, 42 hogs, and 21 sheep; how many head of stock did he sell that day?

5. Frank put 44 cents into the school savings one week, 32 cents another week, and 14 cents another week; how many cents did he put into the school savings in the three weeks?

6. How many persons were in a car if there were in it 34 men, 27 women, and 19 children?

7. 12 oranges, 24 apples, and 21 pears are how many pieces of fruit?

8. 24 roses, 12 carnations, and 12 orchids are how many flowers?

9. 28 men, 76 women, 62 boys, and 78 girls were at a picnic; how many persons attended?

10. Sara weighs 56 pounds, Margaret, 67 pounds, and Helen, 75 pounds; how much do they all weigh?

56 pounds is Sara's weight.

67 pounds is Margaret's weight.

75 pounds is Helen's weight.

75
? pounds is the weight of all.

11. A man bought a fire shovel for 15 cents, a coal bucket for 45 cents, and a poker for 15 cents; how much did he pay for all?

12. Find the cost of a 45-cent broom, a 15-cent scrubbing brush, and a 25-cent dust brush.

13. A farmer thrashed 175 bushels of wheat, 268 bushels of oats, and 45 bushels of rye; how much grain did he thrash?

14. Find the weight of three calves if the first weighed 126 pounds, the second 132 pounds, and the third 148 pounds.

15. A boy's sales of papers during a week were: Monday, 98 papers; Tuesday, 78 papers; Wednesday, 66 papers; Thursday, 53 papers; Friday, 49 papers; and Saturday, 87 papers; how many did he sell that week?

SUBTRACTION

The Lower Number in Each Column Less than the Upper

17. Subtract 354 from 678.

678	4 units from 8 units leaves 4 units.
354	5 tens from 7 tens leaves 2 tens.
<u>324</u>	3 hundreds from 6 hundreds leaves 3 hundreds.
	The difference is 324.

Check : $324 + 354 = 678$.

In practice say: 4 from 8 leaves 4; 5 from 7 leaves 2; 3 from 6 leaves 3.

18. Exercise :

Copy and subtract :

- | | | | |
|---|---|---|---|
| 1. $\begin{array}{r} 36 \\ 20 \\ \hline 16 \end{array}$ | 2. $\begin{array}{r} 56 \\ 12 \\ \hline 44 \end{array}$ | 3. $\begin{array}{r} 44 \\ 22 \\ \hline 22 \end{array}$ | 4. $\begin{array}{r} 35 \\ 23 \\ \hline 12 \end{array}$ |
| 5. $\begin{array}{r} 57 \\ 23 \\ \hline 34 \end{array}$ | 6. $\begin{array}{r} 38 \\ 17 \\ \hline 21 \end{array}$ | 7. $\begin{array}{r} 86 \\ 52 \\ \hline 34 \end{array}$ | 8. $\begin{array}{r} 65 \\ 32 \\ \hline 33 \end{array}$ |
| 9. $\begin{array}{r} 465 \\ 123 \\ \hline 342 \end{array}$ | 10. $\begin{array}{r} 387 \\ 143 \\ \hline 244 \end{array}$ | 11. $\begin{array}{r} 425 \\ 213 \\ \hline 212 \end{array}$ | 12. $\begin{array}{r} 556 \\ 232 \\ \hline 324 \end{array}$ |
| 13. $\begin{array}{r} 676 \\ 405 \\ \hline 271 \end{array}$ | 14. $\begin{array}{r} 328 \\ 110 \\ \hline 218 \end{array}$ | 15. $\begin{array}{r} 999 \\ 345 \\ \hline 654 \end{array}$ | 16. $\begin{array}{r} 758 \\ 34 \\ \hline 724 \end{array}$ |
| 17. $\begin{array}{r} 477 \\ 351 \\ \hline 126 \end{array}$ | 18. $\begin{array}{r} 379 \\ 168 \\ \hline 211 \end{array}$ | 19. $\begin{array}{r} 152 \\ 141 \\ \hline 11 \end{array}$ | 20. $\begin{array}{r} 276 \\ 135 \\ \hline 141 \end{array}$ |

**The Lower Number in One Column, or More than One Column,
Greater than the Upper,**

19. Subtract 386 from 753.

753	6 units cannot be taken from 3 units.
<u>386</u>	Take 1 ten from the 5 tens, leaving 4 tens.
<u>367</u>	Add this 1 ten, or 10 units, to 3 units, making 13 units.

6 units from 13 units leaves 7 units.

8 tens cannot be taken from 4 tens.

Take 1 hundred from the 7 hundreds, leaving 6 hundreds.

Add this 1 hundred, or 10 tens, to the 4 tens, making 14 tens.

8 tens from 14 tens leaves 6 tens.

3 hundreds from 6 hundreds leaves 3 hundreds.

The difference is 367.

Check: $367 + 386 = 753$.

In practice say: 6 from 13 leaves 7; 8 from 14 leaves 6; 3 from 6 leaves 3.

20. Exercise:

Copy and subtract:

- | | | | | | |
|---|---|---|---|---|---|
| 1. $\begin{array}{r} 52 \\ 13 \\ \hline \end{array}$ | 2. $\begin{array}{r} 65 \\ 27 \\ \hline \end{array}$ | 3. $\begin{array}{r} 48 \\ 29 \\ \hline \end{array}$ | 4. $\begin{array}{r} 85 \\ 57 \\ \hline \end{array}$ | 5. $\begin{array}{r} 37 \\ 29 \\ \hline \end{array}$ | 6. $\begin{array}{r} 85 \\ 68 \\ \hline \end{array}$ |
| 7. $\begin{array}{r} 42 \\ 27 \\ \hline \end{array}$ | 8. $\begin{array}{r} 74 \\ 56 \\ \hline \end{array}$ | 9. $\begin{array}{r} 40 \\ 17 \\ \hline \end{array}$ | 10. $\begin{array}{r} 51 \\ 27 \\ \hline \end{array}$ | 11. $\begin{array}{r} 67 \\ 39 \\ \hline \end{array}$ | 12. $\begin{array}{r} 52 \\ 28 \\ \hline \end{array}$ |
| 13. $\begin{array}{r} 186 \\ 28 \\ \hline \end{array}$ | 14. $\begin{array}{r} 192 \\ 49 \\ \hline \end{array}$ | 15. $\begin{array}{r} 228 \\ 189 \\ \hline \end{array}$ | 16. $\begin{array}{r} 374 \\ 185 \\ \hline \end{array}$ | 17. $\begin{array}{r} 756 \\ 457 \\ \hline \end{array}$ | |
| 18. $\begin{array}{r} 705 \\ 296 \\ \hline \end{array}$ | 19. $\begin{array}{r} 310 \\ 105 \\ \hline \end{array}$ | 20. $\begin{array}{r} 834 \\ 528 \\ \hline \end{array}$ | 21. $\begin{array}{r} 657 \\ 588 \\ \hline \end{array}$ | 22. $\begin{array}{r} 681 \\ 589 \\ \hline \end{array}$ | |

Add upward; subtract across:

23. $9 - 3 = ?$

$8 - 5 = ?$

$7 - 2 = ?$

$? - ? = ?$

24. $45 - 24 = ?$

$17 - 13 = ?$

$29 - 23 = ?$

$? - ? = ?$

21. Exercise:

1. James counted 65 animals in a field; 48 of them were cows and the rest were sheep. How many were sheep?

65 was the number of animals in the field.

48 was the number of cows in the field.

? was the number of sheep.

2. Lucy invited 40 of her friends to a picnic, but 12 of them did not come. How many of them came?

3. A boy had 75 papers for sale and sold all of them but 18. How many did he sell?

4. A farmer wishes to plant 60 rows of potatoes; he has already planted 24 rows; how many rows has he yet to plant?

5. A builder had 36 houses for sale and sold all of them but 18; how many did he sell?

6. One engine was pulling 60 cars and another one 38 cars; how many more cars were there in the one train than in the other?

7. A farmer had 460 bushels of corn, sold 275 bushels, and fed the remainder; how much did he use for feed?

8. There were 216 pupils in a certain school; 126 of them were girls. How many were boys?

9. A farmer had 262 chickens. He has sold all of them but 45. How many has he sold?

10. William weighs 107 pounds and John weighs 76 pounds. Find the difference in their weights.

107 pounds is William's weight.

76 pounds is John's weight.

? pounds is the difference of their weights.

11. A farmer wishes to load 60 bushels of grain. He has already loaded 48 bushels. How much more has he to load?

12. A farmer bought 750 pounds of feed; he has used it all except 175 pounds. How much has he used?

ROMAN SYSTEM

22. Letters instead of figures are often used in writing numbers. This method of writing numbers is called the **Roman System**. Some of the letters used are:

I = 1 V = 5 X = 10 L = 50 C = 100

23.

Table

Units		Tens	
I	= 1	X	= 10
II	= 2	XX	= 20
III	= 3	XXX	= 30
IIII or IV	= 4	XL	= 40
V	= 5	L	= 50
VI	= 6	LX	= 60
VII	= 7	LXX	= 70
VIII	= 8	LXXX	= 80
IX	= 9	XC	= 90

24. Exercise :

1. Look at the units' column, Section 23, as an aid in supplying the missing numbers; read across:

$$\begin{array}{lll} \text{II} = 1 + \bullet & \text{III} = 1 + \bullet + \bullet & \text{IIII} = \bullet + \bullet + \bullet + \bullet \\ \text{IV} = 5 - \bullet & \text{VI} = 5 + \bullet & \text{VII} = \bullet + 2 \\ \text{VIII} = \bullet + \bullet & \text{IX} = 10 - \bullet & \end{array}$$

2. Write after X each of the units in turn, beginning with I, and write in figures the numbers formed; read across:

$$\begin{array}{lll} \text{X} \bullet & = 11 & \text{X} \bullet \bullet & = ? & \text{X} \bullet \bullet \bullet & = ? \\ \text{X} \bullet \bullet & = ? & \text{X} \bullet & = ? & \text{X} \bullet \bullet & = ? \\ \text{X} \bullet \bullet \bullet & = ? & \text{X} \bullet \bullet \bullet \bullet & = ? & \text{X} \bullet \bullet & = ? \end{array}$$

3. Write after XX each of the units, as in Example 2, and in figures the numbers formed.

4. Write by the Roman system the numbers between: XXX and XL; XL and L; L and LX; LX and LXX.

5. Write by the Roman system the numbers between: LXX and LXXX; LXXX and XC; XC and C.

Write by the Roman system:

6. The first nine numbers; the nine tens.
7. The numbers between 10 and 20.
8. The numbers between 70 and 90; between 70 and 100.

Write in figures :

9. XIV	XVI	XIX	XXII
10. XXV	XXVIII	XXIX	XXXVII
11. XL	XLI	XLIX	LIX
12. LXVI	LXX	LXXXV	LXXXIX
13. XC	XCIV	XCIX	C

UNITED STATES MONEY

25.

Table

10 cents = 1 dime
25 cents = 1 quarter dollar
50 cents = 1 half dollar
100 cents = 1 dollar
10 dimes = 1 dollar

26. \$ stands for dollar or dollars ; c, ¢, or ct. stands for cent or cents.

Thus, 3 dollars may be written, \$3; 5 cents may be written 5c, 5¢, or 5 ct.

27. Exercise :

1. Write with the dollar sign :

6 dollars	1 dollar	20 dollars	50 dollars
150 dollars	27 dollars	500 dollars	201 dollars

2. Write, using c :

1 cent	5 cents	10 cents	50 cents
25 cents	75 cents	45 cents	66 cents

If a sum of money consists of dollars and cents, a point called the **decimal point** is written between the number of dollars and the number of cents. If the number of cents is less than ten, a cipher is written between the decimal point and the number of cents.

Thus, *2 dollars 45 cents* is written \$2.45, and *5 dollars 6 cents* is written \$5.06. *45 cents* may be written \$0.45.

3. Read:

\$ 3	\$ 5	\$ 10	\$ 5.75	\$ 4.50
\$ 7.25	\$ 6.07	\$ 50.50	\$ 3.08	\$ 0.37
\$ 15.09	\$ 28.25	\$ 16.04	\$ 0.75	\$ 3.08

4. Write, using the dollar sign:

5 dollars 7 dollars 10 cents 1 dollar 7 cents
 35 cents 9 dollars 90 cents 5 dollars 75 cents

5. One nickel is worth how many cents?

6. Two nickels are worth what piece of money?

7. Two dimes and what piece of money are worth 25 cents?

8. Name our four pieces of silver money.

9. A half dollar is worth how many quarter dollars?

10. A dollar is worth how many half dollars? how many quarter dollars?

11. A half dollar is worth how many dimes?

12. A quarter dollar is worth how many nickels?

28. Add \$1.75, \$3.86, and \$4.08.

\$1.75 Write the amounts so that the decimal points shall
 3.86 stand in a column.
4.08 Add as in ordinary numbers.
 \$9.69 Place the decimal point in the sum before the last two
 figures.

29. Exercise :

Copy and add :

1. \$ 0.10 <u>1.45</u>	2. \$ 1.34 <u>2.06</u>	3. \$ 4.05 <u>1.39</u>	4. \$ 0.25 <u>3.15</u>
5. \$ 2.79 <u>3.50</u>	6. \$ 5.00 <u>2.00</u>	7. \$ 6.23 <u>1.98</u>	8. \$ 3.72 <u>4.54</u>
9. \$ 3.65 <u>1.30</u> <u>2.00</u>	10. \$ 7.29 <u>2.51</u> <u>0.11</u>	11. \$ 2.36 <u>5.01</u> <u>1.60</u>	12. \$ 5.41 <u>1.55</u> <u>1.00</u>

Find the cost of all:

13. 1 saw \$ 1.25	14. 1 thermometer \$ 1.50
1 rake .75	1 watering can 1.60
1 pair shears <u>2.25</u>	1 glass cutter <u>3.00</u>
Total	Total

30. Subtract \$1.75 from \$8.60.

\$8.60 SUGGESTION. Write the amounts so that the decimal
1.75 points shall stand in a column.
 6.85 Check: \$6.85 + \$1.75 = \$8.60.

31. Exercise :

Copy and subtract ; check results :

1. $\begin{array}{r} \$9.28 \\ 4.53 \\ \hline \end{array}$	2. $\begin{array}{r} \$4.55 \\ 3.47 \\ \hline \end{array}$	3. $\begin{array}{r} \$7.19 \\ 2.29 \\ \hline \end{array}$	4. $\begin{array}{r} \$5.62 \\ 4.39 \\ \hline \end{array}$
5. $\begin{array}{r} \$6.50 \\ 4.18 \\ \hline \end{array}$	6. $\begin{array}{r} \$1.09 \\ 0.50 \\ \hline \end{array}$	7. $\begin{array}{r} \$4.66 \\ 2.77 \\ \hline \end{array}$	8. $\begin{array}{r} \$3.00 \\ 1.75 \\ \hline \end{array}$
9. $\begin{array}{r} \$8.46 \\ 4.55 \\ \hline \end{array}$	10. $\begin{array}{r} \$4.77 \\ 2.75 \\ \hline \end{array}$	11. $\begin{array}{r} \$9.98 \\ 8.05 \\ \hline \end{array}$	12. $\begin{array}{r} \$7.65 \\ 5.42 \\ \hline \end{array}$

MAKING CHANGE

32. A woman bought a bucket for 34¢ and gave the storekeeper in payment a half dollar. He counted out her change thus: "34, 35, 40, 50." 34¢ was the amount of her purchase; he gave her 1¢ as he said "35," a 5¢ piece as he said "40," and a dime as he said "50." Did the woman receive the right amount of change, and how much did she receive?

33. Exercise :

Count out the right change in each of these purchases, using as few pieces of money as possible, and state how much change is given :

MULTIPLICATION

	Purchases	Money Paid	Change
1.	19¢	quarter dollar	?
2.	32¢	half dollar	?
3.	59¢	65¢	?
4.	62¢	half dollar and quarter dollar	?
5.	21¢	3 dimes	?
6.	69¢	dollar	?
7.	9¢	half dollar	?
8.	\$1.10	\$2 bill	?
9.	\$1.50	\$2 bill	?
10.	\$3.50	\$5 bill	?

MULTIPLICATION

34. $3 + 3 = 2$ times 3.

35. The sign $\times$ stands for *times*.

Thus, 2 times 3 may be written 2×3 .

Multiplying by 2 and by 3

36. Tables

$2 \times 1 = 2$	$3 \times 1 = 3$
$2 \times 2 = 4$	$3 \times 2 = 6$
$2 \times 3 = 6$	$3 \times 3 = 9$
$2 \times 4 = 8$	$3 \times 4 = 12$
$2 \times 5 = 10$	$3 \times 5 = 15$
$2 \times 6 = 12$	$3 \times 6 = 18$
$2 \times 7 = 14$	$3 \times 7 = 21$
$2 \times 8 = 16$	$3 \times 8 = 24$
$2 \times 9 = 18$	$3 \times 9 = 27$
$2 \times 10 = 20$	$3 \times 10 = 30$

37. Exercise :**1. How many are :**

two 1's? three 1's? two 5's? three 5's? two 10's?
three 10's? two 2's? three 2's? three 3's? two 3's?

2. How many are :

two 4's? two 6's? three 6's? three 4's? two 8's?
three 8's? three 7's? two 7's? two 9's? three 9's?

3. What do 2 four-cent stamps cost?

4. What do 3 one-cent stamps cost?

5. 2 nickels are worth how many cents?

6. How many horses will make 2 two-horse teams?

7. How many children are there in 3 classes of 10 children each?

8. How many persons are there at 3 tables, if there are 6 persons at each table?

9. How many horses are there in 3 stables, if there are 6 horses in each stable?

10. A 3-story building, 10 rooms to the story, has how many rooms?

11. 3 windows require how many panes of glass, 4 panes to the window?

12. How many cabbage plants are there in 3 rows, if each row contains 8 cabbage plants?

13. 3 persons each pay 5 cents car fare; how much do they all pay?

Find the cost of :

14. 2 spools of silk at 8¢ each.

15. 2 pounds of sugar at 6¢ a pound.

16. 3 pounds of rice at 8¢ a pound.

17. 3 five-cent packages of firecrackers.

18. 2 five-cent bars of soap.

19. 2 nine-cent funnels.

20. 3 ten-cent packages of breakfast food.

38. Exercise — Review :

Copy, supplying the missing numbers :

1. $2 \times 2 = \bullet$

2. $2 \times \bullet = 2$

3. $2 \times 3 = \bullet$

4. $3 \times 8 = \bullet$

5. $2 \times \bullet = 18$

6. $2 \times 6 = \bullet$

7. $2 \times 7 = \bullet$

8. $2 \times \bullet = 12$

9. $\bullet \times 5 = 10$

10. $3 \times 3 = \bullet$

11. $3 \times 6 = \bullet$

12. $2 \times \bullet = 14$

13. $2 \times \bullet = 6$

14. $3 \times 4 = \bullet$

15. $3 \times \bullet = 24$

16. $2 \times \bullet = 4$

17. $\bullet \times 1 = 2$

18. $2 \times 8 = \bullet$

19. $\bullet \times 9 = 27$

20. $2 \times \bullet = 10$

21. $3 \times 9 = \bullet$

22. $3 \times 5 = \bullet$

23. $3 \times 7 = \bullet$

24. $\bullet \times 3 = 6$

25. $\bullet \times 8 = 24$

26. $\bullet \times 1 = 3$

27. $\bullet \times 6 = 12$

28. $\bullet \times 4 = 8$

29. $2 \times 1 = \bullet$

30. $\bullet \times 2 = 6$

31. $3 \times \bullet = 6$

32. $3 \times \bullet = 21$

33. $3 \times \bullet = 9$

34. $2 \times \bullet = 8$

35. $2 \times 4 = \bullet$

36. $3 \times \bullet = 27$

37. $2 \times 5 = \bullet$

38. $\bullet \times 9 = 18$

39. $\bullet \times 4 = 12$

- | | | |
|-----------------------------|-----------------------------|------------------------------|
| 40. $\bullet \times 2 = 4$ | 41. $\bullet \times 5 = 15$ | 42. $\bullet \times 8 = 16$ |
| 43. $3 \times \bullet = 3$ | 44. $3 \times 2 = \bullet$ | 45. $2 \times 10 = \bullet$ |
| 46. $\bullet \times 6 = 18$ | 47. $2 \times 9 = \bullet$ | 48. $\bullet \times 10 = 30$ |
| 49. $2 \times \bullet = 16$ | 50. $3 \times \bullet = 12$ | 51. $\bullet \times 10 = 20$ |
| 52. $\bullet \times 3 = 9$ | 53. $\bullet \times 7 = 14$ | 54. $2 \times \bullet = 20$ |
| 55. $3 \times \bullet = 15$ | 56. $3 \times 1 = \bullet$ | 57. $3 \times 10 = \bullet$ |
| 58. $\bullet \times 7 = 21$ | 59. $3 \times \bullet = 18$ | 60. $3 \times \bullet = 30$ |

Multiplying Numbers of 2 Figures and 3 Figures by 2 and 3

39. $232 + 232 + 232 = 3 \times 232$.

The answer, 696, may be found by making use of Table, p. 92, thus :

232	3×2 units = 6 units ; write 6 in units' place.
3	3×3 tens = 9 tens ; write 9 in tens' place.
696	3×2 hundreds = 6 hundreds ; write 6 in hundreds' place.
	The answer is 696.

In practice say : 3 times 2 are 6 ; 3 times 3 are 9 ; 3 times 2 are 6.
Here we say that we have **multiplied** 232 by 3.

40. Exercise :

Copy and multiply :

- | | | | | |
|--|--|--|--|--|
| 1. $\begin{array}{r} 11 \\ 2 \\ \hline \end{array}$ | 2. $\begin{array}{r} 12 \\ 2 \\ \hline \end{array}$ | 3. $\begin{array}{r} 20 \\ 2 \\ \hline \end{array}$ | 4. $\begin{array}{r} 22 \\ 2 \\ \hline \end{array}$ | 5. $\begin{array}{r} 13 \\ 2 \\ \hline \end{array}$ |
| 6. $\begin{array}{r} 30 \\ 2 \\ \hline \end{array}$ | 7. $\begin{array}{r} 34 \\ 2 \\ \hline \end{array}$ | 8. $\begin{array}{r} 24 \\ 2 \\ \hline \end{array}$ | 9. $\begin{array}{r} 40 \\ 2 \\ \hline \end{array}$ | 10. $\begin{array}{r} 50 \\ 2 \\ \hline \end{array}$ |
| 11. $\begin{array}{r} 20 \\ 3 \\ \hline \end{array}$ | 12. $\begin{array}{r} 11 \\ 3 \\ \hline \end{array}$ | 13. $\begin{array}{r} 21 \\ 3 \\ \hline \end{array}$ | 14. $\begin{array}{r} 22 \\ 3 \\ \hline \end{array}$ | 15. $\begin{array}{r} 30 \\ 3 \\ \hline \end{array}$ |

16. $\begin{array}{r} 23 \\ 3 \\ \hline \end{array}$	17. $\begin{array}{r} 31 \\ 3 \\ \hline \end{array}$	18. $\begin{array}{r} 32 \\ 3 \\ \hline \end{array}$	19. $\begin{array}{r} 40 \\ 3 \\ \hline \end{array}$	20. $\begin{array}{r} 41 \\ 3 \\ \hline \end{array}$
21. $\begin{array}{r} 111 \\ 2 \\ \hline \end{array}$	22. $\begin{array}{r} 123 \\ 2 \\ \hline \end{array}$	23. $\begin{array}{r} 403 \\ 2 \\ \hline \end{array}$	24. $\begin{array}{r} 142 \\ 2 \\ \hline \end{array}$	25. $\begin{array}{r} 444 \\ 2 \\ \hline \end{array}$
26. $\begin{array}{r} 103 \\ 3 \\ \hline \end{array}$	27. $\begin{array}{r} 230 \\ 3 \\ \hline \end{array}$	28. $\begin{array}{r} 231 \\ 3 \\ \hline \end{array}$	29. $\begin{array}{r} 302 \\ 3 \\ \hline \end{array}$	30. $\begin{array}{r} 333 \\ 3 \\ \hline \end{array}$
31. $\begin{array}{r} \$ 32 \\ 2 \\ \hline \$? \end{array}$	32. $\begin{array}{r} 31 \text{ cows} \\ 3 \\ \hline ? \text{ cows} \end{array}$	33. $\begin{array}{r} 53 \text{ sheep} \\ 2 \\ \hline ? \text{ sheep} \end{array}$	34. $\begin{array}{r} 22 \text{ horses} \\ 3 \\ \hline ? \text{ horses} \end{array}$	
35. $\begin{array}{r} 24 \text{ trees} \\ 2 \\ \hline \end{array}$	36. $\begin{array}{r} 41\phi \\ 2 \\ \hline \end{array}$	37. $\begin{array}{r} 32 \text{ cars} \\ 3 \\ \hline \end{array}$	38. $\begin{array}{r} 52 \text{ birds} \\ 3 \\ \hline \end{array}$	

DIVISION

Dividing by 2 and by 3

41. Each of the two equal parts of a number is called one half ($\frac{1}{2}$) of it.

42. Each of the three equal parts of a number is called one third ($\frac{1}{3}$) of it.

43. Exercise :

Copy, writing the proper numbers after = :

- | | |
|-------------------------|--------------------------|
| 1. $\frac{1}{2}$ of 2 = | 2. $\frac{1}{2}$ of 8 = |
| 3. $\frac{1}{2}$ of 4 = | 4. $\frac{1}{2}$ of 10 = |
| 5. $\frac{1}{2}$ of 6 = | 6. $\frac{1}{2}$ of 12 = |

- | | |
|---------------------------|---------------------------|
| 7. $\frac{1}{2}$ of 14 = | 8. $\frac{1}{3}$ of 12 = |
| 9. $\frac{1}{2}$ of 16 = | 10. $\frac{1}{3}$ of 15 = |
| 11. $\frac{1}{2}$ of 18 = | 12. $\frac{1}{3}$ of 18 = |
| 13. $\frac{1}{2}$ of 20 = | 14. $\frac{1}{3}$ of 21 = |
| 15. $\frac{1}{3}$ of 3 = | 16. $\frac{1}{3}$ of 24 = |
| 17. $\frac{1}{3}$ of 6 = | 18. $\frac{1}{3}$ of 27 = |
| 19. $\frac{1}{3}$ of 9 = | 20. $\frac{1}{3}$ of 30 = |

44. Exercise :

Read Exercise 43, supplying the missing numbers.

45. 1. $\frac{1}{2}$ of 6 = 3; also 3 tells how many 2's there are in 6. ||| ||| || || ||

2. The answer to $\frac{1}{2}$ of a number is the answer to "How many 2's in the number?"

3. Finding $\frac{1}{2}$ of 6, or how many 2's in 6, is called **dividing 6 by 2**.

4. *6 divided by 2* may be written $6 \div 2$.

46. Exercise :

Read and name at sight the answers :

- | | | | |
|-------------------|-------------------|-------------------|-------------------|
| 1. $4 \div 2 =$ | 2. $18 \div 3 =$ | 3. $6 \div 2 =$ | 4. $14 \div 2 =$ |
| 5. $3 \div 3 =$ | 6. $20 \div 2 =$ | 7. $9 \div 3 =$ | 8. $21 \div 3 =$ |
| 9. $2 \div 2 =$ | 10. $30 \div 3 =$ | 11. $6 \div 3 =$ | 12. $16 \div 2 =$ |
| 13. $8 \div 2 =$ | 14. $24 \div 3 =$ | 15. $12 \div 2 =$ | 16. $10 \div 2 =$ |
| 17. $12 \div 3 =$ | 18. $27 \div 3 =$ | 19. $18 \div 2 =$ | 20. $15 \div 3 =$ |

47. Exercise :

1. Tell at sight how many 2's there are in 4 ; 3's in 6 ; what is $\frac{1}{2}$ of 10 ; $\frac{1}{2}$ of 20 ; $\frac{1}{2}$ of 16 ; $\frac{1}{3}$ of 15 ; $\frac{1}{3}$ of 30.
2. $\frac{1}{2}$ of a dozen are how many ? $\frac{1}{3}$ of a dozen ?
3. 18 pails were tied in 2 bundles of the same size ; how many pails were there in a bundle ?
4. 30 children were formed into 3 classes of the same size ; how many were there in each class ?
5. How many 2-horse teams can be formed with 4 horses ?
6. How many 3-foot ropes can be cut from a rope 6 feet long ?
7. 2 boys divide 6 cents equally between them ; what part of the money does each receive ? how much does each receive ?
8. A girl who earns \$12 a week spends $\frac{1}{3}$ of it for board ; how much is her board per week ?
9. If two quarts of sirup cost 20 cents, how much was that a quart ?
10. A log 9 feet long will make how many 3-foot pieces ?
11. I wish to have 30 pounds of sugar put up in three packages of the same weight ; how much must be put up in each package ?
12. If I paid 24 cents for 3 tablets of the same kind, how much was that apiece ?
13. A girl spent 18 cents for 3 pounds of sugar ; how much was that a pound ?

14. A boy had 18 cents; if he spent $\frac{1}{3}$ of it for fruit and $\frac{1}{2}$ of it for cakes, how much did he spend? how much had he left?

Dividing numbers of 2 and 3 figures by 2 and by 3

48. $936 \div 3$ may be written $3 \overline{)936}$ and the answer may be found thus:

$3 \overline{)936}$ $\frac{1}{3}$ of 9 hundreds = 3 hundreds; write 3 in hundreds' place. $\frac{1}{3}$ of 3 tens = 1 ten; write 1 in tens' place.

$\frac{1}{3}$ of 6 units = 2 units; write 2 in units' place.

The answer is 312. *Check:* $3 \times 312 = 936$.

In practice say: $\frac{1}{3}$ of 9 is 3; $\frac{1}{3}$ of 3 is 1; and $\frac{1}{3}$ of 6 is 2.

312 also tells the number of 3's in 936.

49. Exercise:

Copy and divide:

1. $2 \overline{)40}$ 2. $3 \overline{)60}$ 3. $2 \overline{)80}$ 4. $3 \overline{)90}$ 5. $2 \overline{)48}$

6. $2 \overline{)42}$ 7. $3 \overline{)36}$ 8. $2 \overline{)28}$ 9. $3 \overline{)93}$ 10. $3 \overline{)39}$

11. $2 \overline{)200}$ 12. $3 \overline{)300}$ 13. $2 \overline{)400}$ 14. $3 \overline{)600}$ 15. $3 \overline{)900}$

16. $2 \overline{)242}$ 17. $3 \overline{)360}$ 18. $2 \overline{)284}$ 19. $3 \overline{)663}$ 20. $3 \overline{)939}$

21. $2 \overline{)268}$ 22. $3 \overline{)336}$ 23. $2 \overline{)420}$ 24. $3 \overline{)630}$ 25. $3 \overline{)963}$

26. $2 \overline{)202}$ 27. $3 \overline{)366}$ 28. $2 \overline{)462}$ 29. $3 \overline{)603}$ 30. $3 \overline{)909}$

31. $2 \overline{)424}$ bushels 32. $3 \overline{)\$630}$ 33. $2 \overline{)104}$ men
? bushels \$ men

34. $3 \overline{)303}$ days 35. $2 \overline{)106}$ sheep 36. $3 \overline{)693}$ pounds

REVIEW

50. Exercise :

1. What numbers come between :

398 and 401? 289 and 291? 597 and 602?

899 and 904? 179 and 182? 799 and 805?

2. Read :

IV

IX

XV

XIV

XL

LX

XLIV

XCIX

3. Name the sum instantly ; then the difference :

55576785954030403050

4. Name results only :

 $5 + 3 - 2 + 6 - 7 = ?$ Thus, 8, 6, 12, 5. $9 + 4 - 3 + 8 - 2 = ?$ $8 - 5 + 7 + 6 - 3 = ?$

Add upward ; subtract across :

5. $22 - 16 = ?$ $12 - 10 = ?$ $54 - 39 = ?$ $40 - 26 = ?$ $? - ? = ?$ 6. $324 - 278 = ?$ $235 - 157 = ?$ $190 - 108 = ?$ $209 - 68 = ?$ $? - ? = ?$

7. Name the answers at sight :

 2×8 2×9 3×9 3×7 3×8

8. Name the answers at sight :

 $14 \div 2$ $12 \div 2$ $27 \div 3$ $18 \div 3$ $21 \div 3$

9. A man had a \$ 20 bill and a \$ 10 bill ; he bought a suit for \$ 24 and a hat for \$ 3. How much had he left if he gave in payment both bills ?

TIME

51. Exercise :

When the long hand, or **minute hand**, points to XII, the short hand, or **hour hand**, points to the hour.

1. What time does this clock show ?

2. Start at I and count the numbers around the clock face ; how many hours are shown ?

3. Which arrow, the right or the left, shows which way the hands move ?



4. Tell to what numbers the minute hand and the hour hand will point :

1 hour after 7 o'clock ;	2 hours after 7 o'clock ;
3 hours after 7 o'clock ;	4 hours after 7 o'clock.

5. In what time does the minute hand move from XII to XII again ?

The small spaces on the clock face are **minute spaces**.

6. Count the minute spaces on the clock face and tell how many of them the minute hand moves over in one hour.

Learn that :

60 minutes (min.) = 1 hour (hr.).

7. Tell to what number the minute hand points and between what two numbers the hour hand points when the time is :

a quarter past 7 ; half past 7 ; a quarter to 8.

8. How many minute spaces are there from :

XII to III ? XII to VI ? IX to XII ?

Read Examples 9, 10, and 11, supplying the missing numbers :

9. A quarter past 7 is — minutes past 7.

10. Half past 7 is — minutes past 7.

11. A quarter to 8 is — minutes past 7.

12. What is the time when the hour hand points between VI and VII and the minute hand points to :

I ? II ? IV ? V ? VII ? VIII ? X ? XI ?

13. Learn to tell the time when the minute hand points to any one of the 60 minute spaces.

When the hour hand is between VII and VIII, and the minute hand points to X, the time is *10 minutes to 8*, which is the same as *50 minutes past 7*.

Read Examples 14, 15, 16, and 17, supplying the missing numbers :

14. 20 minutes to 2 is — minutes past 1.

15. 10 minutes to 4 is — minutes past 3.

16. 5 minutes to 6 is — minutes past 5.

17. 25 minutes to 11 is — minutes past 10.

Nine forty, written 9.40, is a short way of saying 40 minutes past 9.

18. Read in two ways:

10.40; 1.50; 6.45; 7.55; 8.56; 4.48.

The time that a clock shows when both hands point to XII in the daytime is called **noon**. The time a clock shows when both hands point to XII at night is called **midnight**.

The time from midnight to noon is called **forenoon**; the time from noon to midnight is called **afternoon**.

A.M. stands for forenoon; **P.M.** stands for afternoon.

19. How many hours are there from midnight to noon?
from noon to midnight?

20. How many hours are there from noon to noon again?

21. How many hours are there from midnight to midnight again?

From midnight to midnight again is a day.

24 hours (hr.) = 1 day (da.).

22. Tell which are in the forenoon and which in the afternoon:

6 A.M.	7 P.M.	9 P.M.	1 A.M.
1 P.M.	7.20 P.M.	5.40 A.M.	12.01 A.M.

23. Write as in Example 22:

20 min. past 5, forenoon	10 min. to 6, afternoon
16 min. past 10, forenoon	15 min. to 9, afternoon

TO THE TEACHER. Teach pupils how to use the calendar of the current year.

24. How many days are there in a week? Name them.

25. Which is the first day of the week? the second? the fourth? the seventh?

26. Name and count the months, and learn that:

12 months (mo.) = 1 year (yr.).

27. Learn a short way of writing the names of the months.

28. Find on the calendar:

January first; July fourth; December twenty-fifth; May fifth.

29. What other name is given to January first? to December twenty-fifth?

A short way to write the date January first, 1914, is *Jan. 1, 1914.*

30. Write the date of your birth; of Christmas this year; of Christmas last year; on which Washington was born.

31. Write the names of the months and opposite each the number of days in it.

32. Add the days of all the months of the year; how many are there?

A full date may be written, *Saturday, Feb. 7, 1914.*

33. Write the full date of last New Year; next New Year; last fourth of July; this first of September; this first of October. (See calendars.)

WEATHER CONDITIONS

52. Weather Conditions for March 12 in a Certain Year

HOUR	TEMPERATURE	WEATHER	WIND
6 A.M.	31°	Rain	S. E.
8 A.M.	33°	Partly cloudy	S. E.
Noon	36°	Foggy	S.
4 P.M.	42°	Cloudy	S. W.
6 P.M.	46°	Clear	W.

The sign ° stands for degree or degrees.

Thus, 31 degrees is written 31°.

53. Exercise :

1. Tell what **temperature** this thermometer shows.

2. Find out at what temperature water freezes.

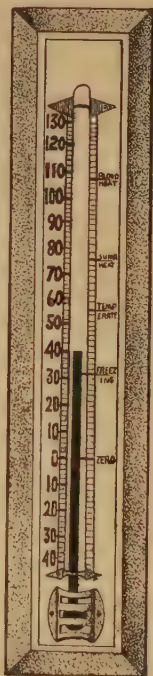
3. Find out at what temperature water boils.

4. Find 32° on this thermometer.

5. What is the temperature of this schoolroom ?

6. Find out, if you can, how **high** the temperature was at your home on one of the warmest days last summer.

7. Find out, if you can, how **low** the temperature was at your home on one of the coldest days last winter.



8. Read from the Table, Section 52, the weather conditions for each hour given for March 12.

9. Rule a form like that in Section 52, make observations at the hours there shown, and write in your observations.

TO THE TEACHER. The pupil should be encouraged to make such observations as are necessary to fill in the facts as given in the Table, Section 52; the accuracy of his observations should be tested.

MULTIPLICATION

Multiplying by 4 and by 5

54.

Tables

$4 \times 1 = 4$	$5 \times 1 = 5$
$4 \times 2 = 8$	$5 \times 2 = 10$
$4 \times 3 = 12$	$5 \times 3 = 15$
$4 \times 4 = 16$	$5 \times 4 = 20$
$4 \times 5 = 20$	$5 \times 5 = 25$
$4 \times 6 = 24$	$5 \times 6 = 30$
$4 \times 7 = 28$	$5 \times 7 = 35$
$4 \times 8 = 32$	$5 \times 8 = 40$
$4 \times 9 = 36$	$5 \times 9 = 45$
$4 \times 10 = 40$	$5 \times 10 = 50$

55. Exercise:

1. How many are:

four 1's? five 2's? four 3's? five 4's? four 5's?
 five 6's? four 7's? five 8's? four 9's? five 10's?

2. How many are:

four 2's? five 1's? four 4's? five 3's? four 6's?
five 5's? four 8's? five 7's? four 10's? five 9's?

3. How many days are there in 4 weeks? 5 weeks?

4. Four nickels are worth how many cents? 4 dimes are worth how many cents?

5. I must pay how many cents for five 5-cent car fares?

6. Five dimes are worth how many 1-cent pieces?

7. Four pairs of mules are how many mules?

8. Four rows of cherry trees, 8 in a row, are how many cherry trees?

9. A passenger car has 8 wheels; five passenger cars have how many wheels?

10. Four automobiles, 8 persons in each, contain how many persons?

Find the cost of:

11. Four pounds of sugar at 7 cents a pound.

12. Five oranges at 3 cents each.

13. Four eye shades at 8 cents each.

14. Four yards of ribbon at 6 cents a yard.

15. Five packs of firecrackers at 5 cents a pack.

16. Five loaves of bread at 6 cents a loaf.

17. Four quarts of milk at 7 cents a quart.

18. Five papers of pins at 5 cents a paper.

56. Exercise — Review :

Copy, supplying the missing numbers :

- | | | |
|------------------------------|------------------------------|-----------------------------|
| 1. $4 \times 1 = \bullet$ | 2. $4 \times \bullet = 12$ | 3. $4 \times 6 = \bullet$ |
| 4. $4 \times \bullet = 32$ | 5. $5 \times \bullet = 20$ | 6. $4 \times 4 = \bullet$ |
| 7. $5 \times \bullet = 35$ | 8. $5 \times 7 = \bullet$ | 9. $\bullet \times 2 = 10$ |
| 10. $5 \times 3 = \bullet$ | 11. $4 \times \bullet = 4$ | 12. $\bullet \times 9 = 36$ |
| 13. $\bullet \times 8 = 40$ | 14. $4 \times \bullet = 28$ | 15. $\bullet \times 7 = 35$ |
| 16. $4 \times 8 = \bullet$ | 17. $5 \times \bullet = 40$ | 18. $5 \times 1 = \bullet$ |
| 19. $5 \times \bullet = 15$ | 20. $\bullet \times 5 = 25$ | 21. $4 \times 2 = \bullet$ |
| 22. $\bullet \times 6 = 24$ | 23. $4 \times 5 = \bullet$ | 24. $\bullet \times 1 = 5$ |
| 25. $\bullet \times 7 = 28$ | 26. $5 \times \bullet = 30$ | 27. $4 \times \bullet = 20$ |
| 28. $\bullet \times 6 = 30$ | 29. $5 \times 9 = \bullet$ | 30. $\bullet \times 3 = 15$ |
| 31. $4 \times 3 = \bullet$ | 32. $5 \times \bullet = 10$ | 33. $\bullet \times 1 = 4$ |
| 34. $5 \times \bullet = 5$ | 35. $5 \times 8 = \bullet$ | 36. $\bullet \times 3 = 12$ |
| 37. $4 \times \bullet = 8$ | 38. $\bullet \times 4 = 16$ | 39. $5 \times 4 = \bullet$ |
| 40. $5 \times 5 = \bullet$ | 41. $\bullet \times 2 = 8$ | 42. $5 \times \bullet = 25$ |
| 43. $\bullet \times 5 = 20$ | 44. $4 \times 7 = \bullet$ | 45. $4 \times \bullet = 36$ |
| 46. $4 \times 9 = \bullet$ | 47. $\bullet \times 9 = 45$ | 48. $5 \times \bullet = 45$ |
| 49. $5 \times 6 = \bullet$ | 50. $4 \times \bullet = 16$ | 51. $\bullet \times 4 = 20$ |
| 52. $4 \times \bullet = 24$ | 53. $5 \times 2 = \bullet$ | 54. $\bullet \times 8 = 32$ |
| 55. $4 \times 10 = \bullet$ | 56. $\bullet \times 10 = 50$ | 57. $5 \times 10 = \bullet$ |
| 58. $\bullet \times 10 = 40$ | 59. $4 \times \bullet = 40$ | 60. $5 \times \bullet = 50$ |

TO THE TEACHER. Such exercises as those in Section 56 should be used, from time to time, as oral reviews, even after pupils have advanced considerably beyond this point.

Multiplying Numbers of 2 Figures and 3 Figures by 2, 3, 4, and 5

57. Multiply 158 by 4.

4×8 units = 32 units, or 3 tens and 2 units; write 2 in units' place.
 4×5 tens = 20 tens, which added to the 3 tens makes 23 tens, or 2 hundreds and 3 tens; write 3 in tens' place.

4×1 hundred = 4 hundreds, which added to the 2 hundreds makes 6 hundreds; write 6 in hundreds' place.

The answer is 632.

58. Exercise:

Copy and multiply:

1. 25 <u>2</u>	2. 38 <u>2</u>	3. 46 <u>2</u>	4. \$ 57 <u>2</u> \$?	5. 69 rails <u>2</u> ? rails
6. 14 <u>3</u>	7. 25 <u>3</u>	8. 36 <u>3</u>	9. \$ 48 <u>3</u>	10. 57 boards <u>3</u>
11. 15 <u>4</u>	12. 24 <u>4</u>	13. 35 <u>4</u>	14. \$ 44 <u>4</u>	15. 96 trees <u>4</u>
16. 17 <u>5</u>	17. 25 <u>5</u>	18. 62 <u>5</u>	19. \$ 78 <u>5</u>	20. 99 ¢ <u>5</u>

21. 409 <u>2</u>	22. 418 <u>2</u>	23. 470 <u>2</u>	24. \$ 367 <u>2</u>	25. 396 pounds <u>2</u>
26. 215 <u>3</u>	27. 207 <u>3</u>	28. 280 <u>3</u>	29. \$ 295 <u>3</u>	30. 199 gallons <u>3</u>
31. 219 <u>4</u>	32. 208 <u>4</u>	33. 205 <u>4</u>	34. \$ 245 <u>4</u>	35. 197 bushels <u>4</u>
36. 109 <u>5</u>	37. 108 <u>5</u>	38. 148 <u>5</u>	39. \$ 197 <u>5</u>	40. 199 days <u>5</u>

59. Exercise :

1. How many pails are there in 4 bundles, if each bundle contains 52 pails?

52 is the number of pails in 1 bundle.

4

? is the number of pails in 4 bundles.

2. How many are there in 4 dozen?

3. How many oranges are there in 3 boxes, each containing 36 oranges?

4. A bushel of oats weighs 32 pounds; find the weight of 3 bushels of oats.

32 pounds is the weight of 1 bushel of oats.

3

? pounds is the weight of 3 bushels of oats.

5. A bushel of wheat weighs 60 pounds; find the weight of 5 bushels of wheat.

6. How much will a clerk save in 4 months, if he saves \$ 26 a month?

7. How many hours are there in 4 days?

8. Find the cost of 3 pounds of butter at 32 cents a pound.

9. Find the cost of 4 pounds of ham at 16 cents a pound.

10. If there are 24 sheets of paper in a box, how many sheets are there in 4 boxes of the same size?

11. Find the cost of 3 hundred shad at \$ 25 per hundred.

12. Loose lime weighs about 70 pounds per bushel. What should 3 bushels of it weigh?

13. What are a laborer's wages for 4 months if his wages are \$ 48 per month?

14. A bushel of sand weighs about 123 pounds. What should 4 bushels of it weigh?

15. 4 months' rent at \$ 25 per month will amount to how much?

16. A barrel of flour weighs 196 pounds; find the weight of 4 barrels of flour.

DIVISION

Dividing by 4 and by 5

60. Each of the four equal parts of a number is called one fourth ($\frac{1}{4}$) of it.

61. Each of the five equal parts of a number is called one fifth ($\frac{1}{5}$) of it.

62. Exercise :

Copy, writing the proper number after = :

1. $\frac{1}{4}$ of 4 =

2. $\frac{1}{4}$ of 8 =

3. $\frac{1}{4}$ of 12 =

4. $\frac{1}{4}$ of 16 =

5. $\frac{1}{4}$ of 20 =

6. $\frac{1}{4}$ of 24 =

7. $\frac{1}{4}$ of 28 =

8. $\frac{1}{4}$ of 32 =

9. $\frac{1}{4}$ of 36 =

10. $\frac{1}{4}$ of 40 =

11. $\frac{1}{5}$ of 5 =

12. $\frac{1}{5}$ of 10 =

13. $\frac{1}{5}$ of 15 =

14. $\frac{1}{5}$ of 20 =

15. $\frac{1}{5}$ of 25 =

16. $\frac{1}{5}$ of 30 =

17. $\frac{1}{5}$ of 35 =

18. $\frac{1}{5}$ of 40 =

19. $\frac{1}{5}$ of 45 =

20. $\frac{1}{5}$ of 50 =

63. Exercise :

Read Exercise 62, supplying the missing numbers.

64. Exercise :

Read, naming at sight the answers :

- | | |
|-------------------|-------------------|
| 1. $4 \div 4 =$ | 2. $12 \div 4 =$ |
| 3. $5 \div 5 =$ | 4. $15 \div 5 =$ |
| 5. $20 \div 4 =$ | 6. $30 \div 5 =$ |
| 7. $24 \div 4 =$ | 8. $40 \div 4 =$ |
| 9. $50 \div 5 =$ | 10. $25 \div 5 =$ |
| 11. $8 \div 4 =$ | 12. $16 \div 4 =$ |
| 13. $20 \div 5 =$ | 14. $35 \div 5 =$ |
| 15. $32 \div 4 =$ | 16. $28 \div 4 =$ |
| 17. $40 \div 5 =$ | 18. $10 \div 5 =$ |
| 19. $36 \div 4 =$ | 20. $45 \div 5 =$ |

65. Exercise :

1. If I pay \$24 for 4 weeks' board, how much per week do I pay?

2. How many 5-cent boxes of matches can be bought for 20 cents?

3. If 40 yards of carpet are cut into 5 equal parts, how long will each piece be?

4. How many 5-cent combs can be bought for 25 cents?

5. 24 boys are marching in 4 equal groups; how many are there in a group?

6. A quarter dollar is worth how many nickels?

7. 12 buttons on a card, 4 buttons to a row, are how many rows?

20 is called a score.

8. How many 5's are there in a score? how many 4's? how many 10's?

Division with Remainders

66. $\bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet = \bullet \bullet \bullet \bullet + \bullet \bullet \bullet \bullet + \bullet$

$\frac{1}{2}$ of 9 = 4 and 1 over.

67. Exercise :

1. Name at sight $\frac{1}{2}$ of each of the following and tell what is over :

3	5	7	15
13	11	17	19

2. Name at sight $\frac{1}{3}$ of each of the following and tell what is over :

4	8	10	13	16	17
5	19	23	28	14	22
7	20	11	25	26	29

3. Name at sight $\frac{1}{4}$ of each of the following and tell what is over :

7	10	15	21	29	30
9	17	37	33	18	27
23	11	31	19	13	35
14	22	26	38	25	39

4. Name at sight $\frac{1}{5}$ of each of the following and tell what is over:

The numbers between 5 and 10; 10 and 15; 15 and 20; 20 and 25; 25 and 30; 30 and 35; 35 and 40; 40 and 45.

5. How many 2-cent stamps can be bought for 15 cents, and what change will there be?

6. 17 ducks will make how many pairs, and leave how many over?

7. How many sheets of drawing paper at 3 cents each can be bought for 10 cents, and how much change will there be?

Dividing Numbers of 2 Figures and 3 Figures by 2, 3, 4, and 5

68. Divide 956 by 4.

$\begin{array}{r} 4 \overline{)956} \\ 239 \end{array}$ $\frac{1}{4}$ of 9 hundreds = 2 hundreds, and 1 hundred, or 10 tens, over.

10 tens + 5 tens = 15 tens.

$\frac{1}{4}$ of 15 tens = 3 tens, and 3 tens, or 30 units, over.

30 units + 6 units = 36 units.

$\frac{1}{4}$ of 36 units = 9 units.

The answer is 239.

Check: $4 \times 239 = 956$.

In practice say: $\frac{1}{4}$ of 9 is 2, and 1 over; $\frac{1}{4}$ of 15 is 3, and 3 over; $\frac{1}{4}$ of 36 is 9.

69. Exercise :

Copy and divide :

- | | | | |
|-------------------------|--------------------------------|---|-------------------------|
| 1. $2 \overline{)30}$ | 2. $2 \overline{)38}$ | 3. $2 \overline{)56}$ | 4. $3 \overline{)42}$ |
| 5. $3 \overline{)54}$ | 6. $3 \overline{)72}$ | 7. $4 \overline{)76}$ | 8. $4 \overline{)60}$ |
| 9. $4 \overline{)72}$ | 10. $5 \overline{)80}$ | 11. $5 \overline{)65}$ | 12. $5 \overline{)90}$ |
| 13. $2 \overline{)430}$ | 14. $2 \overline{)654}$ | 15. $2 \overline{)120}$ | 16. $3 \overline{)642}$ |
| 17. $3 \overline{)873}$ | 18. $3 \overline{)411}$ | 19. $4 \overline{)856}$ | 20. $4 \overline{)412}$ |
| 21. $4 \overline{)508}$ | 22. $2 \overline{)\$72}$
\$ | 23. $2 \overline{)90}$ plants
plants | |
| 24. $5 \overline{)575}$ | 25. $3 \overline{)\$84}$ | 26. $3 \overline{)87}$ days | |
| 27. $5 \overline{)605}$ | 28. $4 \overline{)\$92}$ | 29. $4 \overline{)96}$ bushels | |
| 30. $5 \overline{)915}$ | 31. $5 \overline{)\$85}$ | 32. $5 \overline{)95}$ cows | |
| 33. $2 \overline{)156}$ | 34. $2 \overline{)\$330}$ | 35. $2 \overline{)556}$ posts | |
| 36. $3 \overline{)171}$ | 37. $3 \overline{)\$471}$ | 38. $3 \overline{)831}$ cars | |
| 39. $4 \overline{)216}$ | 40. $4 \overline{)\$660}$ | 41. $4 \overline{)912}$ gallons | |

70. Exercise :

1. A dealer bought 4 dozen eggs for 84 cents; how much was that a dozen?

84 cents was the cost of 4 dozen.

$4 \overline{)84}$ cents

? cents was the cost of 1 dozen.

2. How much was paid a week to a workman who received \$ 75 for 5 weeks' work ?

3. A piece of carpet measuring 72 yards was cut into 4 strips of equal length ; find the length of each strip.

4. 56 chairs are to be arranged in 4 rows with the same number in each row ; how many must be put in a row ?

56 is the number to be put in 4 rows.

$$\begin{array}{r} 4 \overline{)56} \end{array}$$

? is the number that must be put in a row.

5. 144 handkerchiefs were put up in 3 boxes, the same number in each box ; how many were put into each box ?

6. 5 bushels of feed weighed 225 pounds ; what did each bushel weigh ?

7. A man bought 144 colored crayons in boxes containing four pieces each ; how many boxes did he buy ?

144 was the number of pieces bought.

4 was the number of pieces in each box.

$$\begin{array}{r} 4 \overline{)144} \end{array}$$

? was the number of boxes bought.

8. How many 2-cent stamps can be bought for 60 cents ?

9. How many 5-cent pieces will make 75 cents ?

10. At 5 cents a pound, how many pounds of sugar can be bought for 90 cents ?

11. How many 3-bushel bags are needed to hold 168 bushels of grain ?

12. 248 quarts of sirup were put up in 4-quart cans ; how many cans were required ?

REVIEW

71. Exercise :

1. Name results only :

$$7 + 9 - 6 + 4 - 3 + 2 = ?$$

$$2 \times 3 + 4 - 6 + 3 \times 7 = ?$$

SUGGESTION. Think 6 instead of 2×3 , and 21 instead of 3×7

$$2 \times 5 + 8 - 6 - 2 + 3 \times 5 = ?$$

2. Add at sight; subtract at sight :

275	458	646	948	869
<u>200</u>	<u>300</u>	<u>500</u>	<u>210</u>	<u>220</u>

3. Name the answers at sight :

2×7	2×9	4×9	4×7	3×9
5×9	3×6	4×8	5×7	4×6
$27 \div 3$	$36 \div 4$	$45 \div 5$	$36 \div 4$	$24 \div 3$
$28 \div 4$	$35 \div 5$	$18 \div 2$	$21 \div 7$	$40 \div 5$

4. How many hours are there between 8 A. M. and noon? noon and 4 P.M.? 8 A.M. and 1 P.M.? midnight and noon?

5. 3 hours after 6 A.M. is what time?

6. 4 hours before noon is what time?

7. What piece of money is worth 2 quarter dollars and a half dollar?

8. Name 4 pieces of money that are together worth 90¢.

9. How many cars are there in a train made up of 28 coal cars, 18 oil cars, 16 cattle cars, and 12 box cars?

10. A boy who earned 25 cents on Monday earned 15 cents more on Tuesday than on Monday; how much did he earn on Tuesday?

11. Here is a page from a girl's diary. How much did she receive during February? How much did she pay out? How much had she remaining?

CASH ACCOUNT — FEBRUARY					
DATE		RECEIVED		PAID	
2	1 Dr. Gloves			1	25
5	Sheet Music				75
9	Short Story	15	00		
12	Book				90
15	Handkerchiefs			1	50
20	Collars			3	00
22	Illustrating	10	00		
26	Letter Paper			1	00
26	Stamps				40
28	Flowers			1	50
	Balance				

12. How many days are there in March, April, and May together?

13. How old is a man whose age is 4 score and 10 years?

14. How many days are there in July, August, and September together?

15. The following table shows how much money the children in the primary grades of a certain school deposited in their school savings bank during one month and how much they withdrew that month.

GRADE	DEPOSITS	WITH-DRAWALS	BALANCE
First	\$2.76	\$0.25	
Second	3.98	.36	
Third	4.75	.78	
Fourth	5.12	1.04	
Total			

Find the balance each grade had on deposit at the end of the month, the total deposits, the total withdrawals, and the total balance for the month.

16. Here are statements showing how many newspapers a certain newsboy received each day for 2 weeks, and how many he returned unsold. Find the number he sold each day and fill in totals.

First Week

DAY	RECEIVED	RETURNED	SOLD
Mon.	80	7	
Tues.	80	0	
Wed.	100	11	
Thurs.	95	6	
Fri.	95	18	
Sat.	150	12	
Total			

Second Week

DAY	RECEIVED	RETURNED	SOLD
Mon.	80	0	
Tues.	90	6	
Wed.	100	12	
Thurs.	100	15	
Fri.	90	7	
Sat.	150	9	
Total			

How many more did he receive the second week than the first? How many more did he sell? Which week did he return the more?

LIQUID MEASURES

72. Name five articles that are sold by these measures.*



1 pint



1 quart



1 gallon

73.

Table

2 pints (pt.) = 1 quart (qt.)
4 quarts (qt.) = 1 gallon (gal.)

74. Exercise:

1. How many pints are there in:

2 qt.?

3 qt.?

4 qt.?

5 qt.?

2. How many quarts are there in:

2 gal.?

3 gal.?

4 gal.?

5 gal.?

3. 1 gal. equals how many quarts? how many pints?

* These measures are adjusted accurately, in line with the requirements of the National Bureau of Standards.

4. A 16-quart can will hold how many gallons?
5. 10 pint bottles will hold how many quarts of milk?
6. Find the cost of a gallon of milk at 7¢ a quart.
7. Find the cost of $\frac{1}{2}$ a gallon of gasoline at 20¢ a gallon.

Name the answers:

- | | |
|-----------------------------|--------------------------|
| 8. 2 gal. + 3 gal. + 4 gal. | 9. 3 qt. + 2 qt. + 3 qt. |
| 10. 3 pt. + 1 pt. + 2 pt. | 11. 7 gal. - 2 gal. |
| 12. 9 qt. - 5 qt. | 13. 9 pt. - 6 pt. |
| 14. 3×5 gal. | 15. 4×3 qt. |
| 16. 3×3 pt. | 17. 24 gal. $\div$ 3 |
| 18. 24 qt. $\div$ 3 | 19. 28 pt. $\div$ 4 |

DRY MEASURES

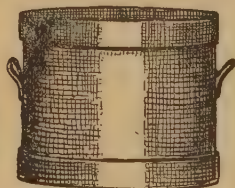
75. Make a list of five kinds of grain, five kinds of fruit, and five kinds of vegetables that are sold by these measures.*



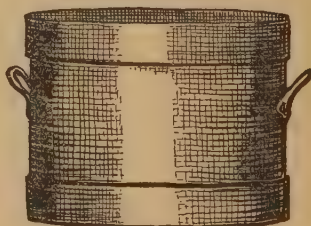
1 pint



1 quart



1 peck



1 bushel

* Adjusted to the legal requirements as called for by the National Bureau of Standards.

76.

Table

2 pints (pt.) = 1 quart (qt.)
 8 quarts (qt.) = 1 peck (pk.)
 4 pecks (pk.) = 1 bushel (bu.)

77. Exercise :

1. How many pints are there in :

2 qt. ? 3 qt. ? 4 qt. ? 5 qt. ?

2. How many quarts are there in :

2 pk. ? 3 pk. ? 4 pk. ? 5 pk. ?

3. How many pecks are there in :

2 bu. ? 3 bu. ? 4 bu. ? 5 bu. ?

4. How many bushels are there in :

16 pk. ? 8 pk. ? 12 pk. ? 20 pk. ?

5. 2 qt. of peas were sold at 8 ¢ a pint; what was received for them ?

6. Find the cost of $\frac{1}{2}$ pk. of potatoes at 20 ¢ a peck.

7. When turnips are selling at 10 ¢ a peck, how much is that a bushel ?

8. 2 qt. of sweet corn were put up in pint packages and sold at 10 ¢ a package; how much was received for them ?

9. How many pecks of grass seed will a 2-bushel bag hold ?

Name the answers :

$$10. 1 \text{ pt.} + 2 \text{ pt.} + 3 \text{ pt.} \quad 11. 5 \text{ bu.} + 3 \text{ bu.} + 4 \text{ bu.}$$

$$12. 2 \text{ pk.} + 6 \text{ pk.} + 4 \text{ pk.} \quad 13. 4 \text{ qt.} + 6 \text{ qt.} + 7 \text{ qt.}$$

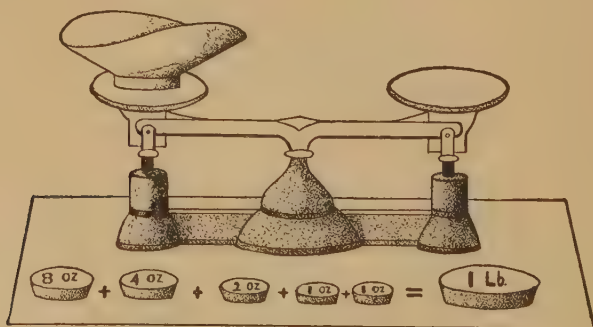
$$14. 25 \text{ bu.} - 9 \text{ bu.} \quad 15. 9 \text{ pk.} - 4 \text{ pk.} \quad 16. 18 \text{ qt.} - 7 \text{ qt.}$$

$$17. 4 \times 18 \text{ bu.} \quad 18. 4 \times 11 \text{ pk.} \quad 19. 5 \times 12 \text{ qt.}$$

$$20. 72 \text{ bu.} \div 4 \quad 21. 45 \text{ pk.} \div 5 \quad 22. 65 \text{ qt.} \div 5$$

MEASURES OF WEIGHT

78. Make a list of five articles sold by these weights and give the price at which the articles on your list are sold.



16 ounces (oz.) = 1 pound (lb.)

79. Exercise :

1. How many ounces are there in :

2 lb.?

3 lb.?

4 lb.?

5 lb.?

Some Market Prices

(Subject to change)

Rice, per lb.	8 ¢
Coffee, per lb.	30 ¢
Cheese, per lb.	20 ¢
Granulated sugar, per lb.	6 ¢
Hams, per lb.	18 ¢
Lard, per lb.	15 ¢
Butter, per lb.	32 ¢

From the price list above find the cost of the following orders:

- | | |
|-------------------------|-------------------------|
| 2. Coffee, 1 lb. | 3. Ham, 2 lb. |
| Granulated sugar, 3 lb. | Cheese, 1 lb. |
| Lard, 2 lb. | Butter, 1 lb. |
| 4. Coffee, 1 lb. | 5. Rice, 3 lb. |
| Granulated sugar, 2 lb. | Granulated sugar, 4 lb. |
| Butter, 1 lb. | Butter, 1 lb. |
| Cheese, 1 lb. | Lard, 1 lb. |

MEASURES OF LENGTH

80. 1. Count the inches on a foot rule.
2. Measure a yardstick with a foot rule.

81.

Table

12 inches (in.) = 1 foot (ft.)
3 feet (ft.) = 1 yard yd.

82. Exercise :

1. How many inches are there in 2 feet?
 2. Many 2-foot rules are made to fold on hinges into 4 equal parts ; how many inches are there in 1 part ?
 3. Look at these lines and tell how long you think each is, and then measure each.
-
-
-

4. Cut off what you think is a foot of string, then test by measuring.

5. Draw on the blackboard a line that you think is a foot long ; measure it ; make it exactly a foot long if it is not ; lay it off in inches, and number the inches as they are numbered on your rule ; then tell how many 6-inch lines in a foot line ; 3-inch lines ; 2-inch lines ; 4-inch lines.

6. Draw a line 2 feet long and measure off on it :
1 ft. 6 in. ; 1 ft. 9 in. ; 2 in. ; 10 in. ; 1 ft. 3 in.

Estimate ; then test with a rule, string, or tape measure to the nearest inch :

7. How tall you are in feet and inches.
8. The length of your step in feet and inches.
9. The length of your schoolroom ; the width.
10. The length of a brick ; the width : the thickness.
11. How many feet are there in :
2 yd. ? 3 yd. ? 4 yd. ? 5 yd. ?

Find the cost of :

12. 4 yd. of gingham at 8 cents a yard.
13. 5 yd. of ribbon at 10 cents a yard.
14. 5 yd. of carpet at \$ 2 a yard.
15. 3 yd. of toweling at 8 cents a yard.

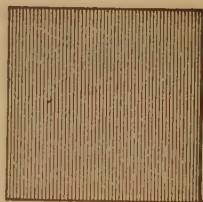
THE SQUARE

83. Exercise :

1. How many sides has this square ?
2. Measure each side of this square with your rule ; how long is each side ?

A square each of whose sides is 1 inch long is a square inch (sq. in.).

3. Cut from paper a 2-inch square ; fold it into square inches and count the square inches.



4. Measure each side of this square ; how long is each side ?

5. How many square inches are there in a 2-inch square ?

6. Cut from paper a 3-inch square, fold it into square inches and count the square inches.

7. How many rows of square inches are there in a 3-inch square? How many square inches are there in a row? How many square inches are there in a 3-inch square?

8. How many square inches are there in a 4-inch square?

9. How many square inches are there in a 5-inch square?

10. Draw on the blackboard a square each of whose sides is 1 foot.

A square each of whose sides is 1 foot long is a square foot (sq. ft.).

A square 2 feet on a side is a 2-foot square.

11. How many rows of square feet are there in a 2-foot square? How many square feet are there in a row?

12. How many square feet are there in a 2-foot square?

A square 3 feet on a side is a 3-foot square.

13. How many rows of square feet are there in a 3-foot square? How many square feet are there in a row?

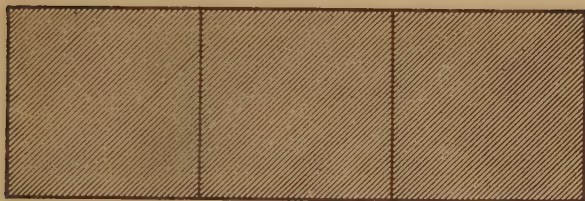
14. How many square feet are there in a 3-foot square?

A 3-foot square is a square each of whose sides is 1 yard long.

A square each of whose sides is 1 yard long is a square yard (sq. yd.).

15. How many square feet are there in a square yard?

THE RECTANGLE OR OBLONG



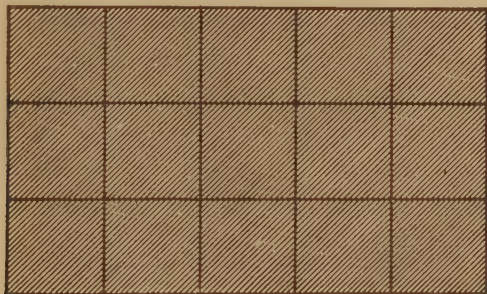
84. Exercise :

1. How long is this rectangle? how wide? how many square inches are there in it?

2. Draw a rectangle 3 in. long and 2 in. wide; divide it into square inches. How many square inches are there in one long row? How many long rows are there? How many square inches are there in the rectangle?

3. Cut from paper a rectangle 3 in. long and 2 in. wide. Fold it into square inches and tell how many it contains.

Here is an oblong divided into small squares.



4. How many long rows of squares has this oblong? How many squares are there in a long row? How many squares are there in the oblong?

5. If each of the squares in the oblong were a square inch, how many square inches would there be in it? If each were a square foot, how many square feet? If each were a square yard, how many square yards?

6. How many square inches are there in a rectangle 3 in. long and 2 in. wide (3 in. by 2 in.)?

7. How many square inches are there in a rectangle :
4 in. by 2 in.? 5 in. by 2 in.? 5 in. by 3 in.?

8. How many square feet are there in a rectangle :
2 ft. by 1 ft.? 3 ft. by 2 ft.? 4 ft. by 2 ft.?

9. How many square yards are there in a rectangle :
3 yd. by 2 yd.? 4 yd. by 2 yd.? 4 yd. by 3 yd.?

REVIEW OF ADDITION AND SUBTRACTION

85. Exercise :

Copy and add :

1. 923	2. 587	3. 826	4. 754	5. 689
317	824	934	267	866
<u>114</u>	<u>212</u>	<u>306</u>	<u>405</u>	<u>510</u>

6. 3598	7. 4683	8. 6523	9. 2489	10. 5469
4827	2785	461	2754	3128
<u>618</u>	<u>1867</u>	<u>2487</u>	<u>4657</u>	<u>1284</u>

11. 2967	12. 4683	13. 5813	14. 6354	15. 4892
296	1598	2167	2145	3268
<u>2765</u>	<u>2387</u>	<u>1456</u>	<u>1267</u>	<u>1133</u>

16. 2589	17. 3509	18. 3687	19. 5123	20. 1726
2167	1446	1568	2069	2834
3248	3029	2206	1333	1283
<u>1179</u>	<u>1347</u>	<u>2487</u>	<u>1282</u>	<u>3287</u>
21. 4682	22. 6003	23. 467	24. 56	25. 3076
792	1760	4589	4832	9
2673	334	6	1523	2875
84	3	108	469	82
<u>9</u>	<u>166</u>	<u>59</u>	<u>6</u>	<u>375</u>

26. \$14.89 + \$23.64 + \$9.36.

\$14.89 SUGGESTION. Write dollars under dollars and cents
 23.64 under cents. Add as in ordinary numbers, and place
 9.36 the decimal point before the last two figures to separate
\$47.89 dollars from cents.

27. \$ 4.35	28. \$ 8.58	29. \$13.48	30. \$ 24.06
6.53	7.36	15.09	34.35
7.25	0.76	32.62	7.83
<u>14.62</u>	<u>28.96</u>	<u>34.16</u>	<u>16.00</u>

31. \$5.27 + \$8.64 + \$23.67 + \$28.62.

32. \$9.28 + \$19 + \$0.68 + \$46.88.

33. \$0.64 + \$14.12 + \$10.36 + \$1.36 + \$0.69.

Find the missing numbers by adding upward and across :

34. $308 + 78 + 230 =$
 $106 + 7 + 98 =$
 $\frac{99 + 126 + 3 =}{? + ? + ? = ?}$

35. $1024 + 276 + 325 =$
 $106 + 72 + 78 =$
 $\frac{48 + 9 + 3 =}{? + ? + ? = ?}$

Find the missing numbers by multiplying across and adding upward:

$$\begin{array}{r} 36. \quad 2 \times 215 = \\ \quad 2 \times 365 = \\ \quad 2 \times 406 = \\ \hline 2 \times ? = ? \end{array}$$

$$\begin{array}{r} 37. \quad 3 \times 325 = \\ \quad 3 \times 209 = \\ \quad 3 \times 367 = \\ \hline 3 \times ? = ? \end{array}$$

$$\begin{array}{r} 38. \quad 4 \times 263 = \\ \quad 4 \times 342 = \\ \quad 4 \times 265 = \\ \hline 4 \times ? = ? \end{array}$$

Copy and subtract:

$$\begin{array}{r} 39. \quad 576 \\ \quad 328 \\ \hline \end{array} \quad \begin{array}{r} 40. \quad 782 \\ \quad 394 \\ \hline \end{array} \quad \begin{array}{r} 41. \quad 684 \\ \quad 297 \\ \hline \end{array} \quad \begin{array}{r} 42. \quad 527 \\ \quad 368 \\ \hline \end{array} \quad \begin{array}{r} 43. \quad 730 \\ \quad 546 \\ \hline \end{array}$$

$$\begin{array}{r} 44. \quad 2945 \\ \quad 1267 \\ \hline \end{array} \quad \begin{array}{r} 45. \quad 8367 \\ \quad 4798 \\ \hline \end{array} \quad \begin{array}{r} 46. \quad 4927 \\ \quad 2848 \\ \hline \end{array} \quad \begin{array}{r} 47. \quad 5642 \\ \quad 3753 \\ \hline \end{array} \quad \begin{array}{r} 48. \quad 4000 \\ \quad 1657 \\ \hline \end{array}$$

$$\begin{array}{r} 49. \quad 6801 \\ \quad 4736 \\ \hline \end{array} \quad \begin{array}{r} 50. \quad 9832 \\ \quad 7257 \\ \hline \end{array} \quad \begin{array}{r} 51. \quad 8000 \\ \quad 5487 \\ \hline \end{array} \quad \begin{array}{r} 52. \quad 5923 \\ \quad 2365 \\ \hline \end{array} \quad \begin{array}{r} 53. \quad 3921 \\ \quad 1278 \\ \hline \end{array}$$

$$\begin{array}{r} 54. \quad 7024 \\ \quad 5637 \\ \hline \end{array} \quad \begin{array}{r} 55. \quad 5230 \\ \quad 2315 \\ \hline \end{array} \quad \begin{array}{r} 56. \quad 6401 \\ \quad 2489 \\ \hline \end{array} \quad \begin{array}{r} 57. \quad 7050 \\ \quad 3762 \\ \hline \end{array} \quad \begin{array}{r} 58. \quad 8203 \\ \quad 4465 \\ \hline \end{array}$$

$$\begin{array}{r} 59. \quad 5000 \\ \quad 2673 \\ \hline \end{array} \quad \begin{array}{r} 60. \quad 9000 \\ \quad 5291 \\ \hline \end{array} \quad \begin{array}{r} 61. \quad 7000 \\ \quad 4976 \\ \hline \end{array} \quad \begin{array}{r} 62. \quad 6000 \\ \quad 3392 \\ \hline \end{array} \quad \begin{array}{r} 63. \quad 3000 \\ \quad 1596 \\ \hline \end{array}$$

$$64. \quad \$27 - \$14.27.$$

$$\begin{array}{r} \$27.00 \\ \quad 14.27 \\ \hline \$12.73 \end{array}$$

SUGGESTION. Write dollars under dollars, and cents under cents. Subtract as in ordinary numbers, and place the decimal point before the last two figures to separate dollars from cents.

65. \$7.36	66. \$25.41	67. \$190.16	68. \$206.55
<u>3.87</u>	<u>12.75</u>	<u>95.50</u>	<u>195.71</u>

69. \$10.00	70. \$42.35	71. \$256.13	72. \$465.32
<u>.75</u>	<u>9.26</u>	<u>123.78</u>	<u>262.94</u>

73. \$ 34.10 - \$ 19.46 74. \$256.96 - \$ 75.92

75. \$975.25 - \$209.75 76. \$700 - \$125.75

77. \$250.50 - \$ 75.75 78. \$500 - \$125.25

Add upward ; subtract across :

79. \$ 7.56 - \$ 6.00 =	80. \$24.56 - \$ 7.26 =
8.27 - 3.25 =	32.18 - 8.42 =
10.56 - 5.90 =	12.16 - 9.27 =
<u> </u>	<u> </u>
? - ? = ?	? - ? = ?

81. A man bought a lot for \$ 350 and built on it a house that cost \$ 1875 ; how much did both cost him ?

82. James had \$2.75 and earned \$ 3.75 more ; how much had he then ?

83. In a certain town there are 3578 males and 4422 females ; how many people has the town ?

84. I had a 1000-mile ticket, but have used 695 miles of it ; how many miles of it have I yet to use ?

85. A farmer's crop for a certain year was 268 bushels of wheat, 308 bushels of oats, 564 bushels of corn, and 78 bushels of rye; how much grain did he raise that year?

86. Frank and John together have \$4.85. If Frank has \$2.90, how much has John?

87. A wagon loaded with coal weighed 5268 pounds. If the wagon weighed 1825 pounds, what was the weight of the coal?

88. A farmer bought a plow for \$8.75 and gave in payment a \$20-bill; how much change should he receive?

89. A farmer was paid \$175.20 for his wheat and \$106.30 for his potatoes; how much was he paid for both?

90. My brother earned \$1.75 on Monday, \$1.60 on Tuesday, \$1.85 on Wednesday, \$1.35 on Thursday, and \$1.75 on Friday; how much did he earn in the 5 days?

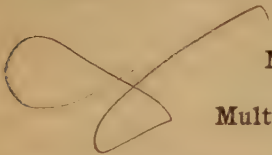
91. I owed B \$100 and gave him a cow worth \$45.50 and the balance in cash; how much cash did I give him?

92. The following table gives the number of bushels of grain bought by a dealer in one week; fill in the totals:

GRAIN	MON.	TUES.	WED.	THURS.	FRI.	SAT.	TOTAL
Wheat .	235	300	201	406	327	195	
Corn . .	421	307	408	560	456	231	
Oats . .	500	480	578	401	492	324	
Rye . .	27	45	38	46	62	14	
Total .							

93. A farmer sold 3 loads of corn. The wagon and corn were first weighed and afterwards the wagon; find the weight of the corn in each load and fill in the totals:

LOADS	GROSS WEIGHT	WEIGHT OF WAGON	WEIGHT OF CORN
First . .	2678 lb.	1269 lb.	
Second. .	3509 lb.	1260 lb.	
Third . .	3328 lb.	1287 lb.	
Total .			



MULTIPLICATION

Multiplying by 6 and by 7

86. Exercise:

Copy, supplying the missing numbers:

$$5 \times 1 + 1 =$$

$$5 \times 6 + 6 =$$

$$\text{or, } 6 \times 1 =$$

$$\text{or, } 6 \times 6 =$$

$$5 \times 2 + 2 =$$

$$5 \times 7 + 7 =$$

$$\text{or, } 6 \times 2 =$$

$$\text{or, } 6 \times 7 =$$

$$5 \times 3 + 3 =$$

$$5 \times 8 + 8 =$$

$$\text{or, } 6 \times 3 =$$

$$\text{or, } 6 \times 8 =$$

$$5 \times 4 + 4 =$$

$$5 \times 9 + 9 =$$

$$\text{or, } 6 \times 4 =$$

$$\text{or, } 6 \times 9 =$$

$$5 \times 5 + 5 =$$

$$5 \times 10 + 10 =$$

$$\text{or, } 6 \times 5 =$$

$$\text{or, } 6 \times 10 =$$

87.

Table

$6 \times 1 = 6$	$6 \times 6 = 36$
$6 \times 2 = 12$	$6 \times 7 = 42$
$6 \times 3 = 18$	$6 \times 8 = 48$
$6 \times 4 = 24$	$6 \times 9 = 54$
$6 \times 5 = 30$	$6 \times 10 = 60$

88. Exercise :

Copy, supplying the missing numbers :

$6 \times 1 + 1 =$	$6 \times 6 + 6 =$
or, $7 \times 1 =$	or, $7 \times 6 =$
$6 \times 2 + 2 =$	$6 \times 7 + 7 =$
or, $7 \times 2 =$	or, $7 \times 7 =$
$6 \times 3 + 3 =$	$6 \times 8 + 8 =$
or, $7 \times 3 =$	or, $7 \times 8 =$
$6 \times 4 + 4 =$	$6 \times 9 + 9 =$
or, $7 \times 4 =$	or, $7 \times 9 =$
$6 \times 5 + 5 =$	$6 \times 10 + 10 =$
or, $7 \times 5 =$	or, $7 \times 10 =$

TO THE TEACHER. Exercises 86 and 88 are given to enable the pupils to build for themselves the tables given in Sections 87 and 89.

89.

Table

$7 \times 1 = 7$	$7 \times 6 = 42$
$7 \times 2 = 14$	$7 \times 7 = 49$
$7 \times 3 = 21$	$7 \times 8 = 56$
$7 \times 4 = 28$	$7 \times 9 = 63$
$7 \times 5 = 35$	$7 \times 10 = 70$

TO THE TEACHER. Drill on the tables of Sections 87 and 89 until pupils can name instantly any of the products. In connection with these drills there should be given frequent reviews of the tables of Sections 64, 67, 79, and 82, Chapter I.

90. Exercise:

1. How many are:

six 1's? six 5's? seven 1's? seven 5's? six
2's? seven 10's? six 3's? seven 2's? six 4's?
six 8's?

2. How many are:

six 10's? seven 8's? seven 3's? seven 6's?
six 6's? six 9's? seven 4's? six 7's? seven
7's? seven 9's?

3. How many days are there in 6 weeks? in 7 weeks?

4. How many quarts are there in 6 gallons? in
7 gallons?

5. How many pecks are there in 6 bushels? in
7 bushels?

6. How many quarts are there in 6 pecks? in 7 pecks?
7. Draw a rectangle 6 in. long and 2 in. wide; divide it into square inches and tell how many square inches it contains.
8. How many bushels will 7 two-bushel bags hold?
9. 6 boxes of cherries at 8 ¢ a box, cost how many cents?
10. A man who sleeps 9 hr. a day sleeps how long each week?
11. A laborer who worked 10 hr. a day for 6 days of a week worked how many hours that week?
12. A woman who spends 6 ¢ a day for milk spends how much a week for it?
Find the cost of:
 13. 6 cans of corn at 10 ¢ each.
 14. 6 lb. of crackers at 8 ¢ a pound.
 15. 7 boxes of strawberries at 6 ¢ a box.
 16. 6 yd. of muslin at 7 ¢ a yard.
 17. 7 bunches of onions at 5 ¢ a bunch.

91. Exercise — Review :

Read, supplying the missing numbers :

- | | | |
|-----------------------------|-----------------------------|----------------------------|
| 1. $6 \times 3 = \bullet$ | 2. $7 \times 7 = \bullet$ | 3. $7 \times \bullet = 49$ |
| 4. $7 \times 9 = \bullet$ | 5. $7 \times 4 = \bullet$ | 6. $6 \times 8 = \bullet$ |
| 7. $7 \times \bullet = 28$ | 8. $7 \times \bullet = 7$ | 9. $6 \times 7 = \bullet$ |
| 10. $\bullet \times 2 = 12$ | 11. $6 \times \bullet = 36$ | 12. $7 \times 5 = \bullet$ |

13. $7 \times 6 = \bullet$	14. $\bullet \times 8 = 48$	15. $\bullet \times 4 = 28$
16. $\bullet \times 6 = 24$	17. $\bullet \times 5 = 30$	18. $7 \times \bullet = 56$
19. $\bullet \times 6 = 42$	20. $6 \times 2 = \bullet$	21. $\bullet \times 4 = 24$
22. $7 \times \bullet = 21$	23. $6 \times 5 = \bullet$	24. $\bullet \times 2 = 14$
25. $\bullet \times 6 = 36$	26. $\bullet \times 8 = 56$	27. $6 \times 1 = \bullet$
28. $6 \times \bullet = 42$	29. $6 \times 9 = \bullet$	30. $6 \times \bullet = 54$
31. $\bullet \times 9 = 54$	32. $\bullet \times 9 = 63$	33. $\bullet \times 1 = 7$
34. $6 \times \bullet = 18$	35. $7 \times 1 = \bullet$	36. $7 \times 8 = \bullet$
37. $\bullet \times 1 = 6$	38. $6 \times 4 = \bullet$	39. $7 \times \bullet = 42$
40. $7 \times \bullet = 63$	41. $6 \times \bullet = 12$	42. $\bullet \times 7 = 42$
43. $6 \times 6 = \bullet$	44. $6 \times \bullet = 24$	45. $7 \times \bullet = 14$
46. $6 \times \bullet = 30$	47. $6 \times \bullet = 6$	48. $7 \times \bullet = 35$
49. $\bullet \times 3 = 18$	50. $\bullet \times 5 = 35$	51. $7 \times 2 = \bullet$
52. $\bullet \times 3 = 21$	53. $6 \times \bullet = 48$	54. $7 \times 3 = \bullet$
55. $6 \times \bullet = 60$	56. $\bullet \times 10 = 60$	57. $6 \times 10 = \bullet$
58. $\bullet \times 10 = 70$	59. $7 \times \bullet = 70$	60. $7 \times 10 = \bullet$

DIVISION

Dividing by 6 and by 7

92. Each of the six equal parts of a number is called **one sixth** ($\frac{1}{6}$) of it.

93. Each of the seven equal parts of a number is called **one seventh** ($\frac{1}{7}$) of it.

94. Exercise :

Copy, writing the proper figure after = :

- | | |
|---------------------------|---------------------------|
| 1. $\frac{1}{6}$ of 6 = | 2. $\frac{1}{6}$ of 12 = |
| 3. $\frac{1}{6}$ of 18 = | 4. $\frac{1}{6}$ of 24 = |
| 5. $\frac{1}{6}$ of 30 = | 6. $\frac{1}{6}$ of 36 = |
| 7. $\frac{1}{6}$ of 42 = | 8. $\frac{1}{6}$ of 48 = |
| 9. $\frac{1}{6}$ of 54 = | 10. $\frac{1}{6}$ of 60 = |
| 11. $\frac{1}{7}$ of 7 = | 12. $\frac{1}{7}$ of 14 = |
| 13. $\frac{1}{7}$ of 21 = | 14. $\frac{1}{7}$ of 28 = |
| 15. $\frac{1}{7}$ of 35 = | 16. $\frac{1}{7}$ of 42 = |
| 17. $\frac{1}{7}$ of 49 = | 18. $\frac{1}{7}$ of 56 = |
| 19. $\frac{1}{7}$ of 63 = | 20. $\frac{1}{7}$ of 70 = |

95. Exercise :

Read Exercise 94, supplying the missing numbers.

96. Exercise :

Read and name at sight the answers :

- | | |
|-------------------|-------------------|
| 1. $6 \div 6 =$ | 2. $14 \div 7 =$ |
| 3. $24 \div 6 =$ | 4. $28 \div 7 =$ |
| 5. $12 \div 6 =$ | 6. $7 \div 7 =$ |
| 7. $18 \div 6 =$ | 8. $21 \div 7 =$ |
| 9. $36 \div 6 =$ | 10. $35 \div 7 =$ |
| 11. $30 \div 6 =$ | 12. $42 \div 7 =$ |

13. $48 \div 6 =$

14. $56 \div 7 =$

15. $42 \div 6 =$

16. $70 \div 7 =$

17. $60 \div 6 =$

18. $63 \div 7 =$

19. $54 \div 6 =$

20. $49 \div 7 =$

97. Exercise :

1. Name the answers at sight :

$\frac{1}{6}$ of 12 ; $\frac{1}{6}$ of 30 ; $\frac{1}{6}$ of 42 ; $\frac{1}{7}$ of 56 ; $\frac{1}{7}$ of 63 ; $\frac{1}{7}$ of 42 ;

24 = — 6's ; 30 = — 6's ; 42 = — 6's ; 36 = — 6's ;

42 = — 7's ; 56 = — 7's ; 49 = — 7's ; 63 = — 7's.

2. How many days are there in $\frac{1}{7}$ of a week ?

3. $\frac{1}{6}$ of a dozen = how many ?

4. How many yards of carpet are there in a piece 21 ft. long ?

5. 42 girls are marching in 6 equal rows ; how many girls are there in a row ?

6. How many weeks are there in 49 days ?

7. 36 pieces of fruit are packed 6 pieces to a box ; how many boxes are there ?

8. A man earns \$18 during the 6 working days of a week ; how much does he earn each working day ?

9. A boy who earns \$54 in 6 months earns how much each month, his earnings per month being the same ?

10. 30 cents will pay for how many 6-cent spools of thread ?

MULTIPLICATION

Multiplying by 8 and by 9

98. Exercise :

Copy, supplying the missing numbers :

$7 \times 1 + 1 =$

or, $8 \times 1 =$

$7 \times 2 + 2 =$

or, $8 \times 2 =$

$7 \times 3 + 3 =$

or, $8 \times 3 =$

$7 \times 4 + 4 =$

or, $8 \times 4 =$

$7 \times 5 + 5 =$

or, $8 \times 5 =$

$7 \times 6 + 6 =$

or, $8 \times 6 =$

$7 \times 7 + 7 =$

or, $8 \times 7 =$

$7 \times 8 + 8 =$

or, $8 \times 8 =$

$7 \times 9 + 9 =$

or, $8 \times 9 =$

$7 \times 10 + 10 =$

or, $8 \times 10 =$

99.

Table

$8 \times 1 = 8$

$8 \times 2 = 16$

$8 \times 3 = 24$

$8 \times 4 = 32$

$8 \times 5 = 40$

$8 \times 6 = 48$

$8 \times 7 = 56$

$8 \times 8 = 64$

$8 \times 9 = 72$

$8 \times 10 = 80$

MULTPLYING BY 8 AND BY 9

100. Exercise :

Copy, supplying the missing numbers :

$8 \times 1 + 1 =$	$8 \times 6 + 6 =$
or, $9 \times 1 =$	or, $9 \times 6 =$
$8 \times 2 + 2 =$	$8 \times 7 + 7 =$
or, $9 \times 2 =$	or, $9 \times 7 =$
$8 \times 3 + 3 =$	$8 \times 8 + 8 =$
or, $9 \times 3 =$	or, $9 \times 8 =$
$8 \times 4 + 4 =$	$8 \times 9 + 9 =$
or, $9 \times 4 =$	or, $9 \times 9 =$
$8 \times 5 + 5 =$	$8 \times 10 + 10 =$
or, $9 \times 5 =$	or, $9 \times 10 =$

101.

Table

$9 \times 1 = 9$	$9 \times 6 = 54$
$9 \times 2 = 18$	$9 \times 7 = 63$
$9 \times 3 = 27$	$9 \times 8 = 72$
$9 \times 4 = 36$	$9 \times 9 = 81$
$9 \times 5 = 45$	$9 \times 10 = 90$

TO THE TEACHER. In connection with drills on the tables of Sections 99 and 101 review tables previously taught.

102. Exercise :

1. How many are :

eight 1's? eight 10's? nine 5's? nine 8's? nine 10's?
 nine 1's? eight 2's? eight 8's? nine 2's? eight 5's?

2. How many are :

nine 4's? nine 9's? eight 3's? eight 7's? nine 6's?
 nine 3's? eight 9's? nine 7's? eight 4's? eight 6's?

3. How many feet are there in 8 yd.? in 9 yd.?

4. How many days are there in 9 weeks?

5. A boy who earns 10¢ an hour for 9 hr. each day earns how much each day?

6. 8 rows of squares, 10 in a row, are how many squares?

7. How many pints are there in 8 qt.?

8. 8 four-gallon cans hold how many gallons?

9. How many square inches are there in a rectangle 8 in. long and 2 in. wide?

10. Find the cost of 9 lambs at \$ 5 each.

11. It requires how many bushels of wheat to fill 9 two-bushel bags?

12. 8 pans of cakes, 6 to the pan, are how many cakes?

103. Exercise — Review :

Read, supplying the missing numbers :

1. $8 \times 2 = \bullet$

2. $\bullet \times 7 = 63$

3. $\bullet \times 1 = 9$

4. $8 \times 8 = \bullet$

5. $9 \times 7 = \bullet$

6. $\bullet \times 9 = 72$

7. 28 <u>7</u>	8. 36 <u>7</u>	9. 54 <u>7</u>	10. 70 <u>7</u>	11. 18 <u>8</u>	12. 26 <u>8</u>
13. 74 <u>8</u>	14. 93 <u>8</u>	15. 50 <u>8</u>	16. 13 <u>9</u>	17. 24 <u>9</u>	18. 37 <u>9</u>
19. 55 <u>9</u>	20. 86 <u>9</u>	21. 128 <u>8</u>	22. 109 <u>7</u>	23. 138 <u>7</u>	24. 145 <u>6</u>
25. 139 <u>6</u>	26. 123 <u>8</u>	27. 109 <u>8</u>	28. 108 <u>9</u>	29. 117 <u>8</u>	30. 122 <u>8</u>

31. Multiply \$ 2.38 by 6.

\$ 2.38	Multiply as in ordinary numbers, and place the
6	decimal point before the last two figures to separate
\$ 14.28	dollars from cents.

32. \$ 4.32 <u>4</u>	33. \$ 0.76 <u>9</u>	34. \$ 56.09 <u>8</u>	35. \$ 29.17 <u>8</u>
36. \$ 9.75 <u>7</u>	37. \$ 138.42 <u>6</u>	38. \$ 94.18 <u>9</u>	39. \$ 125.15 <u>5</u>

105. Exercise :

Copy and fill in the missing amounts in the following :

1. The cost of :

6 plum trees at \$1.25 each =

8 peach trees at \$0.80 each =

7 pear trees at \$1.10 each =

Total = \$

2. Find the cost of 6 yards of cloth at 15 cents a yard.
3. A car that makes 24 trips a day makes how many trips a week?
4. How many hours are there in a week?
5. A gardener planted 8 rows of trees; if he planted 16 trees in each row, how many trees did he plant in all?
6. A farmer sold 8 loads of wheat; there were 25 bushels in each load; how many bushels did he sell?
7. A bushel of wheat weighs 60 pounds; find the weight of 8 bushels of wheat.
8. A bushel of corn weighs 56 pounds; find the weight of 6 bags of corn, each holding 3 bushels.
9. How many eggs will 9 crates hold, if each crate holds 6 dozen?
10. How many persons can be seated in 8 rows of chairs, if there are 38 chairs in each row?
11. How many persons can be seated in 6 cars, if there are 36 seats in each car and 2 persons can sit on each seat?

DIVISION

Dividing by 8 and by 9

106. Each of the eight equal parts of a number is called **one eighth** ($\frac{1}{8}$) of it.
107. Each of the nine equal parts of a number is called **one ninth** ($\frac{1}{9}$) of it.

108. Exercise :

Copy, writing the proper figure after =:

- | | |
|---------------------------|---------------------------|
| 1. $\frac{1}{8}$ of 8 = | 2. $\frac{1}{8}$ of 16 = |
| 3. $\frac{1}{8}$ of 24 = | 4. $\frac{1}{8}$ of 32 = |
| 5. $\frac{1}{8}$ of 40 = | 6. $\frac{1}{8}$ of 48 = |
| 7. $\frac{1}{8}$ of 56 = | 8. $\frac{1}{8}$ of 64 = |
| 9. $\frac{1}{8}$ of 72 = | 10. $\frac{1}{8}$ of 80 = |
| 11. $\frac{1}{9}$ of 9 = | 12. $\frac{1}{9}$ of 18 = |
| 13. $\frac{1}{9}$ of 27 = | 14. $\frac{1}{9}$ of 36 = |
| 15. $\frac{1}{9}$ of 45 = | 16. $\frac{1}{9}$ of 54 = |
| 17. $\frac{1}{9}$ of 63 = | 18. $\frac{1}{9}$ of 72 = |
| 19. $\frac{1}{9}$ of 81 = | 20. $\frac{1}{9}$ of 90 = |

109. Exercise :

Read Exercise 108, supplying the missing numbers.

110. Exercise :

Read, and name at sight the answers:

- | | |
|-------------------|-------------------|
| 1. $8 \div 8 =$ | 2. $18 \div 9 =$ |
| 3. $32 \div 8 =$ | 4. $36 \div 9 =$ |
| 5. $16 \div 8 =$ | 6. $9 \div 9 =$ |
| 7. $24 \div 8 =$ | 8. $27 \div 9 =$ |
| 9. $48 \div 8 =$ | 10. $45 \div 9 =$ |
| 11. $40 \div 8 =$ | 12. $54 \div 9 =$ |
| 13. $64 \div 8 =$ | 14. $72 \div 9 =$ |

15. $56 \div 8 =$

16. $63 \div 9 =$

17. $80 \div 8 =$

18. $90 \div 9 =$

19. $72 \div 8 =$

20. $81 \div 9 =$

111. Exercise:

1. Name the answers at sight:

$$\frac{1}{8} \text{ of } 16; \quad \frac{1}{8} \text{ of } 56; \quad \frac{1}{8} \text{ of } 72; \quad \frac{1}{9} \text{ of } 63; \quad \frac{1}{9} \text{ of } 54; \quad \frac{1}{9} \text{ of } 72;$$

$$48 = \text{—— } 8\text{'s}; \quad 72 = \text{—— } 8\text{'s}; \quad 64 = \text{—— } 8\text{'s};$$

$$56 = \text{—— } 8\text{'s}; \quad 63 = \text{—— } 9\text{'s}; \quad 54 = \text{—— } 9\text{'s}.$$

2. How many pecks are there in 32 quarts?

3. How many 8-foot logs can be cut from a log 40 feet long?

4. A grocer put 56 pounds of sugar into 8 sacks of the same size; how much did he put in each sack?

5. My brother and I bought 9 dozen tomato plants for 72 cents; how much was that a dozen?

6. A woman sold a dealer chickens at 8 cents a pound; he paid her 72 cents for them; how many pounds did she sell him?

7. I wish to set out 64 plants in 8 rows; how many must I put in a row, if I put the same number in each?

Dividing Numbers of More than One Figure Each**112. Exercise:**

Copy and divide:

1. $6 \overline{)60}$

2. $6 \overline{)60}$

3. $7 \overline{)77}$

4. $7 \overline{)70}$

5. $8 \overline{)88}$

6. $6 \overline{)84}$

7. $6 \overline{)90}$

8. $6 \overline{)96}$

- | | | | |
|-------------------------|-------------------------|-------------------------|-------------------------|
| 9. $7 \overline{)91}$ | 10. $7 \overline{)84}$ | 11. $8 \overline{)96}$ | 12. $7 \overline{)98}$ |
| 13. $6 \overline{)102}$ | 14. $9 \overline{)108}$ | 15. $8 \overline{)104}$ | 16. $6 \overline{)366}$ |
| 17. $6 \overline{)672}$ | 18. $6 \overline{)804}$ | 19. $6 \overline{)954}$ | 20. $6 \overline{)750}$ |
| 21. $7 \overline{)147}$ | 22. $7 \overline{)791}$ | 23. $7 \overline{)812}$ | 24. $7 \overline{)903}$ |
| 25. $7 \overline{)819}$ | 26. $8 \overline{)248}$ | 27. $8 \overline{)896}$ | 28. $8 \overline{)624}$ |
| 29. $8 \overline{)920}$ | 30. $8 \overline{)704}$ | 31. $9 \overline{)819}$ | 32. $9 \overline{)765}$ |
| 33. $9 \overline{)648}$ | 34. $9 \overline{)531}$ | 35. $9 \overline{)396}$ | 36. $9 \overline{)612}$ |

37. Divide \$18.75 by 5.

5 $\overline{) \$18.75}$
 \$ 3.75

Divide as in ordinary numbers, and place the decimal before the last two figures to separate dollars from cents.

Divide:

- | | | |
|------------------------------|-------------------------------|-------------------|
| 38. $2 \overline{) \$18.72}$ | 39. $7 \overline{) \$35.14}$ | 40. \$178.50 by 5 |
| 41. $3 \overline{) \$31.05}$ | 42. $9 \overline{) \$193.05}$ | 43. \$374.24 by 4 |
| 44. $6 \overline{) \$15.48}$ | 45. $5 \overline{) \$100.10}$ | 46. \$127.00 by 5 |
| 47. $8 \overline{) \$33.60}$ | 48. $6 \overline{) \$127.08}$ | 49. \$38.07 by 9 |

113. Exercise :

1. If I paid 30 cents for pencils at 3 cents each, how many did I buy?

2. How many 4-pound weights will weigh 12 pounds?

3. How many 10-pound weights will weigh 30 pounds?

4. 35 days are how many weeks?

5. 32 panes of glass are needed for how many windows, eight panes to a window?

6. 30 onions will make how many half-dozen bunches?

7. A farmer sold 2 cows, the first for \$35 and the second for \$43; what was the average selling price?

\$ 35 was the selling price of the first.

\$ 43 was the selling price of the second.

2) \$ 78 was the selling price of both.

\$? was the **average** selling price.

8. A merchant bought 2 hams; the first weighed 23 pounds and the second 25 pounds; what was their average weight?

9. A lady bought 6 yards of cloth for 96 cents; how much was it a yard?

10. A dealer sold 6 horses for \$900; he received the same sum for each; how much did he receive for each?

11. 7 men caught 819 shad and shared them equally; how many did each receive?

12. A man earned \$84 in 6 weeks and his son earned \$66; how much did both earn? How much did both earn in a week?

13. A man rode 644 miles on Tuesday and $\frac{1}{7}$ as far on Wednesday; how far did he ride in the two days?

14. In 9 classrooms there are 405 desks; if each room contains the same number of desks, how many are there in each room?

15. A dealer had 500 dressed chickens; he sold 68 of them and shipped the remainder in 6 barrels of equal size; how many did he put into each barrel?

16. Divide \$648 among 3 persons, giving the first person $\frac{1}{6}$ of the money, the second $\frac{1}{9}$ of it, and the third the remainder.

17. How many pecks are there in 216 quarts?

18. How many weeks are there in 364 days?

19. How many trains of 9 cars each can be made up from 189 cars?

20. I owed \$728, and paid \$32; I wish to pay the rest in 6 equal parts; how much must I pay in each part?

Find the cost of 1 pound of each, if:

21. 6 lb. of coffee cost \$2.10.

22. 8 lb. of dried beef cost \$2.00.

23. 5 lb. of ham cost \$0.80.

24. 4 lb. of tea cost \$2.80.

25. 7 lb. of butter cost \$1.96.

26. 9 lb. of cheese cost \$1.44.

27. 3 lb. of yarn cost \$1.05.

28. 8 lb. of prunes cost \$1.20.

REVIEW OF MULTIPLICATION AND DIVISION

114. Exercise :

Find the missing numbers by multiplying across and adding upward :

$$\begin{array}{r} 1. \quad 3 \times 127 = \\ \quad 3 \times 489 = \\ \quad 3 \times 765 = \\ \quad 3 \times 389 = \\ \hline 3 \times ? = ? \end{array}$$

$$\begin{array}{r} 2. \quad 4 \times 189 = \\ \quad 4 \times 276 = \\ \quad 4 \times 354 = \\ \quad 4 \times 967 = \\ \hline 4 \times ? = ? \end{array}$$

$$\begin{array}{r} 3. \quad 5 \times 139 = \\ \quad 5 \times 287 = \\ \quad 5 \times 106 = \\ \quad 5 \times 54 = \\ \hline 5 \times ? = ? \end{array}$$

$$\begin{array}{r} 4. \quad 6 \times 98 = \\ \quad 6 \times 76 = \\ \quad 6 \times 125 = \\ \quad 6 \times 349 = \\ \hline 6 \times ? = ? \end{array}$$

$$\begin{array}{r} 5. \quad 7 \times 109 = \\ \quad 7 \times 87 = \\ \quad 7 \times 36 = \\ \quad 7 \times 245 = \\ \hline 7 \times ? = ? \end{array}$$

$$\begin{array}{r} 6. \quad 8 \times 89 = \\ \quad 8 \times 123 = \\ \quad 8 \times 57 = \\ \quad 8 \times 146 = \\ \hline 8 \times ? = ? \end{array}$$

Divide and check :

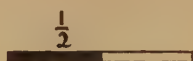
- | | | |
|----------------|----------------|----------------|
| 7. 612 by 6. | 8. 294 by 7. | 9. 336 by 8. |
| 10. 477 by 9. | 11. 978 by 6. | 12. 371 by 7. |
| 13. 760 by 8. | 14. 846 by 9. | 15. 792 by 8. |
| 16. 924 by 7. | 17. 837 by 9. | 18. 944 by 8. |
| 19. 732 by 6. | 20. 812 by 7. | 21. 696 by 8. |
| 22. 873 by 9. | 23. 896 by 8. | 24. 936 by 6. |
| 25. 4152 by 6. | 26. 2247 by 7. | 27. 2512 by 8. |
| 28. 6642 by 9. | 29. 8608 by 8. | 30. 2436 by 7. |
| 31. 4896 by 9. | 32. 4840 by 8. | 33. 3246 by 6. |

DIVISION

Results not Whole Numbers

Dividing by 2

115. One of the two equal parts of one is one half ($\frac{1}{2}$).

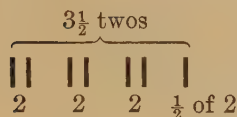


116. Find $\frac{1}{2}$ of 5.

Answer thus: $\frac{1}{2}$ of 5 is 2 and 1 over; $\frac{1}{2}$ of 1 is $\frac{1}{2}$.

The answer is *two and one half*; written $2\frac{1}{2}$.

117. How many 2's are there in 7?



Answer thus: There are 3 twos in 7 and 1 over.

This 1 over is $\frac{1}{2}$ of another 2.

Therefore, the number of 2's in 7 is $3\frac{1}{2}$, read *three and one half*.

118. Exercise :

Find :

- | | | | |
|------------------------|------------------------|------------------------|------------------------|
| 1. $\frac{1}{2}$ of 3 | 2. $\frac{1}{2}$ of 7 | 3. $\frac{1}{2}$ of 9 | 4. $\frac{1}{2}$ of 13 |
| 5. $\frac{1}{2}$ of 11 | 6. $\frac{1}{2}$ of 15 | 7. $\frac{1}{2}$ of 17 | 8. $\frac{1}{2}$ of 19 |

How many:

- | | | |
|----------------|----------------|----------------|
| 9. 2's in 3? | 10. 2's in 5? | 11. 2's in 9? |
| 12. 2's in 13? | 13. 2's in 7? | 14. 2's in 15? |
| 15. 2's in 11? | 16. 2's in 17? | 17. 2's in 19? |

Copy and divide:

18. How many quarts are there in 9 pints?

19. If 2 packages of biscuit cost 15 cents, how much does one package cost?

20. When toweling is selling at 2 yards for 13 cents, how much is that a yard?

21. $\frac{1}{2}$ of 9 pints is how many pints?

22. If a man earned \$5 in 2 days, how much was that a day?

23. An iron rod 9 feet long was divided into two equal parts; find the length of each part.

24. A man who earns 2 dollars a day must work how many days to earn 11 dollars?

Dividing by 3

119. One of the three equal parts of one is one third ($\frac{1}{3}$).



120. One third of two is one third and one third, or two thirds ($\frac{2}{3}$).

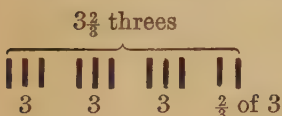


121. Find $\frac{1}{3}$ of 17.

Answer thus: $\frac{1}{3}$ of 17 is 5, and 2 over; $\frac{1}{3}$ of 2 is $\frac{2}{3}$.

The answer is $5\frac{2}{3}$.

122. How many 3's are there in 11?



Answer thus: There are 3 *threes* in 11 and 2 over

These two over are $\frac{2}{3}$ of another 3.

Therefore, the number of 3's in 11 is $3\frac{2}{3}$, read *three and two thirds*.

123. Exercise :

Find :

- | | | | |
|------------------------|-------------------------|-------------------------|-------------------------|
| 1. $\frac{1}{3}$ of 5 | 2. $\frac{1}{3}$ of 8 | 3. $\frac{1}{3}$ of 11 | 4. $\frac{1}{3}$ of 14 |
| 5. $\frac{1}{3}$ of 4 | 6. $\frac{1}{3}$ of 7 | 7. $\frac{1}{3}$ of 16 | 8. $\frac{1}{3}$ of 19 |
| 9. $\frac{1}{3}$ of 10 | 10. $\frac{1}{3}$ of 22 | 11. $\frac{1}{3}$ of 23 | 12. $\frac{1}{3}$ of 25 |

How many :

- | | |
|----------------|----------------|
| 13. 3's in 7? | 14. 3's in 13? |
| 15. 3's in 16? | 16. 3's in 23? |
| 17. 3's in 25? | 18. 3's in 19? |
| 19. 3's in 22? | 20. 3's in 29? |
21. How many yards are there in 16 feet?
22. If a man earns 3 dollars a day, in how many days will he earn 20 dollars?
23. If a piece of carpet 16 yards long was cut into 3 equal strips, how long was each strip?

Dividing by 4

124. One of the four equal parts of one is
- one fourth**
- (
- $\frac{1}{4}$
-).



1. What are two of the four equal parts of one called?
2. What are three of the four equal parts of one called?
3. Read: $\frac{1}{4}$; $\frac{2}{4}$; $\frac{3}{4}$; $\frac{4}{4}$.

4. $\frac{2}{4}$ equals how many halves?
5. Show that $\frac{1}{4}$ of $2 = \frac{2}{4}$, or $\frac{1}{2}$.
6. Show that $\frac{1}{4}$ of $3 = \frac{3}{4}$.

125. Find $\frac{1}{4}$ of 14.

Answer thus: $\frac{1}{4}$ of 14 is 3 and 2 over; $\frac{1}{4}$ of 2 is $\frac{2}{4}$, or $\frac{1}{2}$.

- The answer is $3\frac{1}{2}$.

126. How many 4's are there in 14?

$\begin{array}{ccccccc} \bullet & \bullet & \bullet & & \bullet & \bullet & \bullet & & \bullet & \bullet & \bullet & & \bullet & \bullet \\ 4 & & 4 & & 4 & & \frac{1}{2} & \text{of } 4. \end{array}$

$$14 = 3\frac{1}{2} \text{ fours.}$$

Answer thus: There are 3 *fours* in 14 and 2 over. These 2 are $\frac{1}{2}$ of another 4. Therefore the number of 4's in 14 is $3\frac{1}{2}$, read *three and one half*.

127. Exercise:

Find:

- | | | | |
|------------------------|------------------------|------------------------|------------------------|
| 1. $\frac{1}{4}$ of 5 | 2. $\frac{1}{4}$ of 7 | 3. $\frac{1}{4}$ of 6 | 4. $\frac{1}{4}$ of 9 |
| 5. $\frac{1}{4}$ of 11 | 6. $\frac{1}{4}$ of 10 | 7. $\frac{1}{4}$ of 25 | 8. $\frac{1}{4}$ of 27 |

How many:

- | | | |
|----------------|----------------|----------------|
| 9. 4's in 9? | 10. 4's in 15? | 11. 4's in 18? |
| 12. 4's in 22? | 13. 4's in 33? | 14. 4's in 35? |
| 15. 4's in 39? | 16. 4's in 41? | |

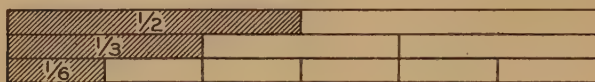
17. If 4 pounds of sugar cost 25 cents, how much was that a pound?

18. How many quarts of berries must a boy pick to earn 30 cents if he is paid 4 cents for picking each quart?

19. 14 yards of dress goods were used to make 4 waists, how many yards were used to make one waist, if each contained the same amount of goods?

Dividing by 6

128. One of the six equal parts of one is **one sixth** ($\frac{1}{6}$).



129. Exercise :

1. What are 2 of the six equal parts of 1 called?
2. Read: $\frac{1}{6}$; $\frac{3}{6}$; $\frac{5}{6}$; $\frac{6}{6}$; $\frac{2}{6}$; $\frac{4}{6}$.
3. In $\frac{1}{2}$ there are how many sixths?
4. In $\frac{1}{3}$ there are how many sixths?
5. In $\frac{2}{3}$ there are how many sixths?
6. Show that $\frac{1}{6}$ of 2 is $\frac{2}{6}$, or $\frac{1}{3}$.
7. Show that $\frac{1}{6}$ of 3 is $\frac{3}{6}$, or $\frac{1}{2}$.
8. Show that $\frac{1}{6}$ of 4 is $\frac{4}{6}$, or $\frac{2}{3}$.
9. Show that $\frac{1}{6}$ of 5 is $\frac{5}{6}$.

Find:

- | | | | |
|-------------------------|-------------------------|-------------------------|-------------------------|
| 10. $\frac{1}{6}$ of 7 | 11. $\frac{1}{6}$ of 8 | 12. $\frac{1}{6}$ of 9 | 13. $\frac{1}{6}$ of 13 |
| 14. $\frac{1}{6}$ of 16 | 15. $\frac{1}{6}$ of 20 | 16. $\frac{1}{6}$ of 28 | 17. $\frac{1}{6}$ of 25 |

How many:

- | | | |
|----------------|----------------|----------------|
| 18. 6's in 8? | 19. 6's in 14? | 20. 6's in 15? |
| 21. 6's in 20? | 22. 6's in 25? | 23. 6's in 32? |
| 24. 6's in 35? | 25. 6's in 50? | |

26. If 6 pounds of soap cost 25 cents, how much is that a pound?

27. What is the price per box when 6 boxes of matches are sold for 5¢?

28. How many crates will 38 boxes of berries fill, and how many boxes over, if there are 6 boxes to a crate?

29. 2 score will make how many half dozens?

Dividing by 8

130. One of the eight equal parts of one is **one eighth** ($\frac{1}{8}$).



131. Exercise :

1. How many eighths are there in 1?
2. How many eighths are there in $\frac{1}{4}$? in $\frac{1}{2}$?
3. How many eighths are there in $\frac{3}{4}$?
4. Read: $\frac{2}{8}$; $\frac{5}{8}$; $\frac{3}{8}$; $\frac{4}{8}$; $\frac{6}{8}$; $\frac{8}{8}$.
5. How many fourths are there in $\frac{2}{8}$? in $\frac{4}{8}$? in $\frac{6}{8}$?
6. How many halves are there in $\frac{4}{8}$? in $\frac{8}{8}$?
7. Show that $\frac{1}{8}$ of 2 is $\frac{2}{8}$, or $\frac{1}{4}$.
8. Show that $\frac{1}{8}$ of 4 is $\frac{4}{8}$, or $\frac{1}{2}$.
9. Show that $\frac{1}{8}$ of 6 is $\frac{6}{8}$, or $\frac{3}{4}$.
10. What is $\frac{1}{8}$ of 20?
11. What is $\frac{1}{8}$ of 25?
12. What is $\frac{1}{8}$ of 22?
13. What is $\frac{1}{8}$ of 18?
14. How many 8's are there in 15?

15. How many 8's are there in 30 ?
 16. How many 8's are there in 44 ?
 17. How many 8's are there in 50 ?
 18. How many pecks are there in 20 quarts ?
 19. At 8 cents a yard, how many yards of ribbon can be bought for 30 cents ?
 20. 60 bushels of wheat will fill how many 8-bushel boxes, and how many bushels will there be over ?

132. Divide 435 by 4.

$$\begin{array}{r} 4 \overline{)435} \\ 108\frac{3}{4} \end{array}$$

$\frac{1}{4}$ of 435 = $\frac{1}{4}$ of (4 hundreds + 3 tens + 5 units).
 $\frac{1}{4}$ of 4 hundreds = 1 hundred.
 $\frac{1}{4}$ of 3 tens = 0 tens, and 3 tens over.

3 tens + 5 units = 35 units.

$\frac{1}{4}$ of 35 units = 8 units, and 3 units over.

$\frac{1}{4}$ of 3 units = $\frac{3}{4}$ of a unit. The answer is $108\frac{3}{4}$.

133. Exercise :

Copy and divide :

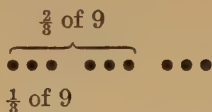
- | | | | |
|------------------------|------------------------|------------------------|------------------------|
| 1. $2 \overline{)31}$ | 2. $2 \overline{)45}$ | 3. $2 \overline{)37}$ | 4. $2 \overline{)49}$ |
| 5. $2 \overline{)67}$ | 6. $2 \overline{)71}$ | 7. $2 \overline{)63}$ | 8. $2 \overline{)85}$ |
| 9. $3 \overline{)41}$ | 10. $3 \overline{)34}$ | 11. $3 \overline{)65}$ | 12. $3 \overline{)56}$ |
| 13. $3 \overline{)77}$ | 14. $3 \overline{)95}$ | 15. $3 \overline{)89}$ | 16. $3 \overline{)74}$ |
| 17. $4 \overline{)37}$ | 18. $4 \overline{)65}$ | 19. $4 \overline{)51}$ | 20. $4 \overline{)47}$ |
| 21. $4 \overline{)70}$ | 22. $4 \overline{)89}$ | 23. $4 \overline{)63}$ | 24. $4 \overline{)98}$ |

25. $6 \overline{)51}$	26. $6 \overline{)74}$	27. $6 \overline{)92}$	28. $6 \overline{)80}$
29. $6 \overline{)115}$	30. $6 \overline{)101}$	31. $6 \overline{)158}$	32. $6 \overline{)124}$
33. $8 \overline{)74}$	34. $8 \overline{)91}$	35. $8 \overline{)55}$	36. $8 \overline{)60}$
37. $8 \overline{)156}$	38. $8 \overline{)169}$	39. $8 \overline{)187}$	40. $8 \overline{)170}$

134. Exercise :

1. When handkerchiefs are sold at 2 for 25 cents, how much is paid for each?
2. If a turkey weighing 6 pounds sold for 95 cents, how much was that a pound?
3. In 2 rods there are 33 feet; how many feet are there in 1 rod?
4. How much is paid for a pint of varnish if it is sold at 65 cents a quart?
5. If 2 dressed hogs weigh 625 pounds, what is their average weight?
6. What was the average weight of 2 steers, if one weighed 875 pounds and the other 964 pounds?
7. What is the average age of the five members of a graduating class, if their ages are 17 years, 16 years, 18 years, 15 years, and 15 years, respectively?
8. A woman paid 50 cents for 4 yards of velvet trimming; how much was it a yard?
9. Two cans of lard weighed 56 pounds each and a third can weighed 48 pounds; what was their average weight?

Finding Two or More Parts of a Whole Number

135. Find $\frac{2}{3}$ of 9.

Answer thus: $\frac{1}{3}$ of 9 is 3, and $\frac{2}{3}$ of 9 is 2 times 3, or 6.

136. Exercise :

Find :

- | | | | |
|-------------------------|-------------------------|-------------------------|-------------------------|
| 1. $\frac{2}{3}$ of 6 | 2. $\frac{2}{3}$ of 12 | 3. $\frac{3}{4}$ of 28 | 4. $\frac{2}{5}$ of 20 |
| 5. $\frac{2}{3}$ of 3 | 6. $\frac{2}{3}$ of 21 | 7. $\frac{3}{4}$ of 32 | 8. $\frac{3}{5}$ of 30 |
| 9. $\frac{2}{3}$ of 9 | 10. $\frac{3}{4}$ of 12 | 11. $\frac{3}{4}$ of 24 | 12. $\frac{3}{5}$ of 45 |
| 13. $\frac{2}{3}$ of 15 | 14. $\frac{3}{4}$ of 16 | 15. $\frac{2}{5}$ of 10 | 16. $\frac{4}{5}$ of 25 |
| 17. $\frac{5}{6}$ of 12 | 18. $\frac{2}{7}$ of 35 | 19. $\frac{6}{7}$ of 70 | 20. $\frac{7}{8}$ of 48 |

137. Exercise :

- What is $\frac{2}{3}$ of 27?
- What is $\frac{2}{3}$ of 6 pounds?
- What is $\frac{2}{3}$ of 12 quarts?
- What is $\frac{3}{4}$ of 16 bushels?
- How many oranges are $\frac{3}{4}$ of 12 oranges.
- How many cents are $\frac{2}{5}$ of 10 cents.
- If 18 cents was the cost of 3 pounds of sugar, what should 2 pounds cost?
- How much should be paid for 2 pencils, if 3 pencils cost 15 cents?

9. A baker charged me 12 cents for 3 loaves of bread; what should he charge me for 2 loaves?

10. If 3 horses are fed 24 quarts of oats a day, how much does that allow for 2 horses?

11. I owed a 16-dollar store bill and paid $\frac{3}{4}$ of it; how much did I pay?

12. Martha is 20 years old and May is $\frac{3}{5}$ as old. How old is May?

13. A boy paid 10 cents for a tablet, and $\frac{3}{5}$ as much for a ruler. How much did he pay for both?

14. If 5 loaves of bread cost 30 cents, how much should 4 loaves cost?

15. What should I be paid for 3 days' work, if I was paid 15 dollars for 5 days' work?

16. A boy was given 25 words to spell. He misspelled $\frac{2}{5}$ of them. How many did he spell correctly?

17. If there are 21 dots in three rows, each containing the same number, how many dots are there in 2 of these rows?

18. If 6 times a number is 30, the number is what part of 30? What is 2 times the number?

19. If 6 times a number is 24, what is 3 times the number?

20. If 7 times a number is 56, what is 6 times the number?

21. $\frac{3}{10}$ of a score are how many?

22. A farmer had 63 sheep and sold $\frac{7}{9}$ of them; how many had he left?

23. $\frac{2}{7}$ of a week is how many days?

24. A turkey weighing 12 pounds, live weight, weighed only $\frac{5}{6}$ as much when dressed; how much did it lose in the dressing?

25. 7 cans of lard of equal size weighed 70 pounds; how much did 2 of them weigh?

26. If 6 dozen bananas cost 60 cents, what should 3 dozen of them cost?

27. If 600 rails sold for 48 dollars, for how much should 2 hundred rails sell?

28. I have 42 tablets in 7 packages of equal size; how many tablets are there in 3 of these packages?

MULTIPLICATION AND DIVISION

Multiplying by 10 and by 100

138. Here are 12 dots arranged in 3 rows of 4 dots each, or 4 columns of 3 dots each, which shows that:

$$3 \times 4 = 4 \times 3$$



139. $10 \times 6 = 6 \times 10$, or 60.

Therefore,

To multiply a whole number by 10, annex one 0 (place one 0 at the right).

140. Exercise :

State rapidly the answer to each of the following :

10×1

10×16

10×100

10×2

10×19

10×125

10×3

10×11

10×140

10×4

10×13

10×135

10×5

10×12

10×120

10×6

10×20

10×150

141. $100 \times 7 = 7 \times 100$, or 700 ; therefore,

To multiply a whole number by 100 annex two 0's.

142. Exercise :

State rapidly the answer to each of the following :

100×7

100×15

100×70

100×9

100×35

100×10

100×2

100×20

100×25

143. Exercise :

1. Find the cost of 10 qt. of chestnuts at 12¢ a quart.
2. 10 bags of wheat, 120 lb. to the bag, weigh how much ?
3. 100 dimes are worth how many cents ?
4. How much must be paid for 100 two-cent postal cards ?
5. 100 years is called a century ; how many months are there in a century ?

6. 10 men each earning \$ 4 per day earn together how much per day?
7. Find the weight of 100 two-pound sacks of salt.
8. Find the weight of 100 five-pound sacks of sugar.
9. Find the weight of 100 ten-pound sacks of sugar.
10. Find the cost of 10 horses at \$ 200 a head.

Multiplying by Numbers Ending in 0's

144. Multiply 36 by 200.

$$\begin{array}{r}
 36 \\
 \underline{200} \\
 7200
 \end{array}
 \qquad
 \begin{array}{l}
 200 = 2 \times 100, \text{ or } 100 \times 2; \\
 200 \times 36 = 100 \times 2 \times 36 \\
 = 100 \times 72, \text{ or } 7200.
 \end{array}$$

145. Exercise :

Multiply :

$$\begin{array}{r}
 1. \quad 15 \\
 \underline{20}
 \end{array}$$

$$\begin{array}{r}
 2. \quad 45 \\
 \underline{30}
 \end{array}$$

$$\begin{array}{r}
 3. \quad 62 \\
 \underline{40}
 \end{array}$$

$$\begin{array}{r}
 4. \quad 60 \\
 \underline{40}
 \end{array}$$

$$\begin{array}{r}
 5. \quad 33 \\
 \underline{50}
 \end{array}$$

$$\begin{array}{r}
 6. \quad 75 \\
 \underline{60}
 \end{array}$$

$$\begin{array}{r}
 7. \quad 38 \\
 \underline{70}
 \end{array}$$

$$\begin{array}{r}
 8. \quad 80 \\
 \underline{70}
 \end{array}$$

$$\begin{array}{r}
 9. \quad 35 \\
 \underline{200}
 \end{array}$$

$$\begin{array}{r}
 10. \quad 47 \\
 \underline{200}
 \end{array}$$

$$\begin{array}{r}
 11. \quad 39 \\
 \underline{200}
 \end{array}$$

$$\begin{array}{r}
 12. \quad 28 \\
 \underline{300}
 \end{array}$$

146. Exercise :

1. How much fertilizer must be bought for a 12-acre field, if 400 lb. are to be used to the acre?
2. How many yards of bunting are there in 50 pieces, each containing 24 yd.?

3. There are 24 sheets in a quire and 20 quires in a ream; how many sheets are there in a ream of paper?
4. 200 doz. of eggs are how many eggs?
5. 300 students, each paying \$6 per week for board, pay in all how much per week?
6. 20 bales of straw, 100 lb. to the bale, weigh how much?
7. 20 fifty-pound weights weigh how much?
8. 20 employees should be paid how much per month if each is paid \$60 per month?

Dividing by 10 and by 100

147. Because $10 \times 40 = 400$

$$400 \div 10 = 40$$

Therefore,

To divide a number ending in 0 by 10, cancel (cut off) the 0.

148. Exercise:

State rapidly the answers:

$20 \div 10$

$200 \div 10$

$1000 \div 10$

$50 \div 10$

$300 \div 10$

$2000 \div 10$

$70 \div 10$

$350 \div 10$

$2700 \div 10$

149. Because $100 \times 7 = 700$

$$700 \div 100 = 7$$

Therefore,

To divide a number ending in two 0's by 100, cancel both 0's.

150. Exercise :

State rapidly the answers :

$200 \div 100$

$1000 \div 100$

$400 \div 100$

$5000 \div 100$

$300 \div 100$

$9000 \div 100$

$700 \div 100$

$4000 \div 100$

Dividing by Numbers Ending in 0's

151. Since $20 \times 3 = 60$, $60 \div 20 = 3$.

The answer 3 may be found thus :

$$\begin{array}{r} 20 \overline{)60} \\ 30 \end{array}$$

Therefore,

To divide a number ending in 0 by another number ending in 0, cancel the 0 at the end of each and divide.

152. Exercise :

Copy and divide :

1. $20 \overline{)80}$

2. $30 \overline{)60}$

3. $30 \overline{)90}$

4. $40 \overline{)80}$

5. $20 \overline{)60}$

6. $20 \overline{)100}$

7. $30 \overline{)120}$

8. $50 \overline{)150}$

9. $40 \overline{)120}$

10. $20 \overline{)160}$

11. $30 \overline{)300}$

12. $30 \overline{)210}$

13. $40 \overline{)160}$

14. $40 \overline{)240}$

15. $50 \overline{)250}$

16. $40 \overline{)400}$

17. $50 \overline{)350}$

18. $60 \overline{)600}$

19. $60 \overline{)420}$

20. $60 \overline{)540}$

153. Since $200 \times 3 = 600$, $600 \div 200 = 3$.

The answer 3 may be found thus:

$$\begin{array}{r} 200 \overline{)600} \\ 300 \end{array}$$

Therefore,

To divide a number ending in two o's by another number ending in two o's, cancel both o's at the end of each number and divide.

154. Exercise:

Copy and divide:

1. $100 \overline{)200}$ 2. $200 \overline{)400}$ 3. $300 \overline{)600}$ 4. $300 \overline{)900}$
 5. $400 \overline{)1200}$ 6. $500 \overline{)1000}$ 7. $400 \overline{)2000}$ 8. $500 \overline{)2500}$
 9. $600 \overline{)3000}$ 10. $600 \overline{)4200}$ 11. $700 \overline{)5600}$ 12. $700 \overline{)7000}$

Multiplying by 11 and by 12

155. Exercise:

Multiply:

1. $\begin{array}{r} 11 \\ 2 \\ \hline \end{array}$ 2. $\begin{array}{r} 11 \\ 3 \\ \hline \end{array}$ 3. $\begin{array}{r} 11 \\ 4 \\ \hline \end{array}$ 4. $\begin{array}{r} 11 \\ 5 \\ \hline \end{array}$ 5. $\begin{array}{r} 11 \\ 6 \\ \hline \end{array}$

6. $11 \times 2 = 2 \times 11$, or — 7. $11 \times 3 = 3 \times 11$, or —

8. $11 \times 4 = 4 \times 11$, or — 9. $11 \times 7 = 7 \times 11$, or —

10. State rapidly the answer to each of the following:

- 11×1 11×3 11×5 11×7 11×9
 11×2 11×4 11×6 11×8 11×10

Multiply:

11. $\begin{array}{r} 12 \\ 2 \\ \hline \end{array}$	12. $\begin{array}{r} 12 \\ 3 \\ \hline \end{array}$	13. $\begin{array}{r} 12 \\ 4 \\ \hline \end{array}$	14. $\begin{array}{r} 12 \\ 5 \\ \hline \end{array}$	15. $\begin{array}{r} 12 \\ 6 \\ \hline \end{array}$
--	--	--	--	--

16. $12 \times 2 = 2 \times 12$, or — 17. $12 \times 3 = 3 \times 12$, or —

18. $12 \times 4 = 4 \times 12$, or — 19. $12 \times 6 = 6 \times 12$, or —

20. State rapidly the answer to each of the following:

12×1	12×3	12×5	12×7	12×9
12×2	12×4	12×6	12×8	12×10

156. Exercise — Review:

State rapidly the answer to each of the following:

- | | | |
|--------------------|---------------------|---------------------|
| 1. 10×9 | 2. 10×14 | 3. 10×122 |
| 4. 10×10 | 5. 10×15 | 6. 10×110 |
| 7. 100×5 | 8. 100×21 | 9. 100×32 |
| 10. 100×8 | 11. 100×11 | 12. 100×25 |
| 13. 20×7 | 14. 30×8 | 15. 40×9 |
| 16. 50×3 | 17. 50×4 | 18. 60×8 |
| 19. 200×5 | 20. 300×3 | 21. 400×2 |
| 22. $30 \div 10$ | 23. $500 \div 10$ | 24. $300 \div 10$ |
| 25. $150 \div 10$ | 26. $800 \div 10$ | 27. $5000 \div 10$ |
| 28. $100 \div 100$ | 29. $600 \div 100$ | 30. $6000 \div 100$ |
| 31. $40 \div 20$ | 32. $800 \div 20$ | 33. $300 \div 30$ |
| 34. $280 \div 40$ | 35. $350 \div 50$ | 36. $300 \div 60$ |

37. What is the cost of 20 yd. of carpet at \$2 a yard?

38. How many \$20 bills are worth \$100?

39. A man exchanged 150 one-dollar bills for \$5 bills; how many \$5 bills did he receive?

157.

Multiplication Tables

$1 \times 1 = 1$ $1 \times 2 = 2$ $1 \times 3 = 3$ $1 \times 4 = 4$ $1 \times 5 = 5$ $1 \times 6 = 6$ $1 \times 7 = 7$ $1 \times 8 = 8$ $1 \times 9 = 9$ $1 \times 10 = 10$ $1 \times 11 = 11$ $1 \times 12 = 12$	$2 \times 1 = 2$ $2 \times 2 = 4$ $2 \times 3 = 6$ $2 \times 4 = 8$ $2 \times 5 = 10$ $2 \times 6 = 12$ $2 \times 7 = 14$ $2 \times 8 = 16$ $2 \times 9 = 18$ $2 \times 10 = 20$ $2 \times 11 = 22$ $2 \times 12 = 24$	$3 \times 1 = 3$ $3 \times 2 = 6$ $3 \times 3 = 9$ $3 \times 4 = 12$ $3 \times 5 = 15$ $3 \times 6 = 18$ $3 \times 7 = 21$ $3 \times 8 = 24$ $3 \times 9 = 27$ $3 \times 10 = 30$ $3 \times 11 = 33$ $3 \times 12 = 36$	$4 \times 1 = 4$ $4 \times 2 = 8$ $4 \times 3 = 12$ $4 \times 4 = 16$ $4 \times 5 = 20$ $4 \times 6 = 24$ $4 \times 7 = 28$ $4 \times 8 = 32$ $4 \times 9 = 36$ $4 \times 10 = 40$ $4 \times 11 = 44$ $4 \times 12 = 48$
$5 \times 1 = 5$ $5 \times 2 = 10$ $5 \times 3 = 15$ $5 \times 4 = 20$ $5 \times 5 = 25$ $5 \times 6 = 30$ $5 \times 7 = 35$ $5 \times 8 = 40$ $5 \times 9 = 45$ $5 \times 10 = 50$ $5 \times 11 = 55$ $5 \times 12 = 60$	$6 \times 1 = 6$ $6 \times 2 = 12$ $6 \times 3 = 18$ $6 \times 4 = 24$ $6 \times 5 = 30$ $6 \times 6 = 36$ $6 \times 7 = 42$ $6 \times 8 = 48$ $6 \times 9 = 54$ $6 \times 10 = 60$ $6 \times 11 = 66$ $6 \times 12 = 72$	$7 \times 1 = 7$ $7 \times 2 = 14$ $7 \times 3 = 21$ $7 \times 4 = 28$ $7 \times 5 = 35$ $7 \times 6 = 42$ $7 \times 7 = 49$ $7 \times 8 = 56$ $7 \times 9 = 63$ $7 \times 10 = 70$ $7 \times 11 = 77$ $7 \times 12 = 84$	$8 \times 1 = 8$ $8 \times 2 = 16$ $8 \times 3 = 24$ $8 \times 4 = 32$ $8 \times 5 = 40$ $8 \times 6 = 48$ $8 \times 7 = 56$ $8 \times 8 = 64$ $8 \times 9 = 72$ $8 \times 10 = 80$ $8 \times 11 = 88$ $8 \times 12 = 96$
$9 \times 1 = 9$ $9 \times 2 = 18$ $9 \times 3 = 27$ $9 \times 4 = 36$ $9 \times 5 = 45$ $9 \times 6 = 54$ $9 \times 7 = 63$ $9 \times 8 = 72$ $9 \times 9 = 81$ $9 \times 10 = 90$ $9 \times 11 = 99$ $9 \times 12 = 108$	$10 \times 1 = 10$ $10 \times 2 = 20$ $10 \times 3 = 30$ $10 \times 4 = 40$ $10 \times 5 = 50$ $10 \times 6 = 60$ $10 \times 7 = 70$ $10 \times 8 = 80$ $10 \times 9 = 90$ $10 \times 10 = 100$ $10 \times 11 = 110$ $10 \times 12 = 120$	$11 \times 1 = 11$ $11 \times 2 = 22$ $11 \times 3 = 33$ $11 \times 4 = 44$ $11 \times 5 = 55$ $11 \times 6 = 66$ $11 \times 7 = 77$ $11 \times 8 = 88$ $11 \times 9 = 99$ $11 \times 10 = 110$ $11 \times 11 = 121$ $11 \times 12 = 132$	$12 \times 1 = 12$ $12 \times 2 = 24$ $12 \times 3 = 36$ $12 \times 4 = 48$ $12 \times 5 = 60$ $12 \times 6 = 72$ $12 \times 7 = 84$ $12 \times 8 = 96$ $12 \times 9 = 108$ $12 \times 10 = 120$ $12 \times 11 = 132$ $12 \times 12 = 144$

Multiplying by any Number of Two Figures

158. Multiply 268 by 32.

This shows the complete work :

$$\begin{array}{r} 268 \\ 32 \\ \hline 2 \times 268 = 536 \\ 30 \times 268 = 8040 \\ \hline 32 \times 268 = 8576 \end{array}$$

In practice write only this :

$$\begin{array}{r} 268 \\ 32 \\ \hline 536 \\ 804 \\ \hline 8576 \end{array}$$

159. Exercise :

Copy and multiply :

1. $\begin{array}{r} 47 \\ 13 \\ \hline \end{array}$	2. $\begin{array}{r} 52 \\ 15 \\ \hline \end{array}$	3. $\begin{array}{r} 61 \\ 17 \\ \hline \end{array}$	4. $\begin{array}{r} 58 \\ 22 \\ \hline \end{array}$	5. $\begin{array}{r} 67 \\ 23 \\ \hline \end{array}$
6. $\begin{array}{r} 65 \\ 27 \\ \hline \end{array}$	7. $\begin{array}{r} 73 \\ 32 \\ \hline \end{array}$	8. $\begin{array}{r} 79 \\ 37 \\ \hline \end{array}$	9. $\begin{array}{r} 84 \\ 35 \\ \hline \end{array}$	10. $\begin{array}{r} 68 \\ 41 \\ \hline \end{array}$
11. $\begin{array}{r} 87 \\ 47 \\ \hline \end{array}$	12. $\begin{array}{r} 89 \\ 49 \\ \hline \end{array}$	13. $\begin{array}{r} 93 \\ 54 \\ \hline \end{array}$	14. $\begin{array}{r} 97 \\ 51 \\ \hline \end{array}$	15. $\begin{array}{r} 95 \\ 56 \\ \hline \end{array}$
16. $\begin{array}{r} 68 \\ 63 \\ \hline \end{array}$	17. $\begin{array}{r} 77 \\ 69 \\ \hline \end{array}$	18. $\begin{array}{r} 87 \\ 73 \\ \hline \end{array}$	19. $\begin{array}{r} 93 \\ 79 \\ \hline \end{array}$	20. $\begin{array}{r} 75 \\ 68 \\ \hline \end{array}$
21. $\begin{array}{r} 81 \\ 79 \\ \hline \end{array}$	22. $\begin{array}{r} 89 \\ 83 \\ \hline \end{array}$	23. $\begin{array}{r} 94 \\ 86 \\ \hline \end{array}$	24. $\begin{array}{r} 96 \\ 93 \\ \hline \end{array}$	25. $\begin{array}{r} 99 \\ 99 \\ \hline \end{array}$
26. $\begin{array}{r} 427 \\ 12 \\ \hline \end{array}$	27. $\begin{array}{r} 342 \\ 13 \\ \hline \end{array}$	28. $\begin{array}{r} 452 \\ 14 \\ \hline \end{array}$	29. $\begin{array}{r} 209 \\ 16 \\ \hline \end{array}$	30. $\begin{array}{r} 390 \\ 21 \\ \hline \end{array}$
31. $\begin{array}{r} 409 \\ 21 \\ \hline \end{array}$	32. $\begin{array}{r} 380 \\ 22 \\ \hline \end{array}$	33. $\begin{array}{r} 214 \\ 24 \\ \hline \end{array}$	34. $\begin{array}{r} 198 \\ 39 \\ \hline \end{array}$	35. $\begin{array}{r} 176 \\ 42 \\ \hline \end{array}$

160. Exercise :

1. How many hours are there in June?
2. Find the cost of twenty-five thousand feet of boards at \$48 per thousand feet.
3. Find the weight of 25 barrels of flour, each of which weighs 196 pounds.
4. If an engineer's wages for a month are \$120, what are his wages per year?
5. A farmer hauled to the mill 75 bushels of oats weighing 32 pounds to the bushel. What weight of oats did he haul?
6. Counting 60 pounds to the bushel, what should 45 bushels of potatoes weigh?
7. 36 feet equals how many inches?
8. Find the weight of 32 blocks of ice, 57 pounds to the block.
9. A farmer sold 3 loads of wheat, the first containing 56 bushels, the second 40 bushels, and the third 48 bushels; what was the total weight, estimating 60 pounds to the bushel?
10. Find the cost of a lot fronting 60 feet on a street, and costing \$45 per front foot.
11. Find the weight of 24 sacks of fertilizer, 168 lb. to the sack.
12. How many minutes are there in 18 hr.?
13. Multiply the sum of 275 and 425 by 12.

Find the cost of :

14. 15 tons of coal at \$6.75 per ton.
15. 48 bu. of corn at \$0.65 per bushel.
16. 65 bu. of wheat at \$1.05 per bushel.
17. 24 lb. of poultry at \$0.14 per pound.
18. 36 doz. eggs at \$0.35 per dozen.
19. 2 doz. chairs at \$3.75 for each chair.
20. 24 yd. of cloth at \$1.25 per yard.
21. 18 lb. of ham at \$0.16 per pound.
22. 25 lb. of cheese at \$0.18 per pound.
23. Find the cost of the following bill:

36 yd. of carpet	at \$1.25
40 yd. of matting	at .25
24 yd. of gingham	at .18
30 yd. of linen	at <u>.32</u>

GENERAL REVIEW

161. Exercise :

1. Beginning at the right, name the first three places in a whole number.
2. Name the number which has 5 in the third place, 4 in the second, and 9 in the first, counting from the right.
3. Write two numbers by the Roman system, each with the letters I, X, and V, and only these.

Write as one number :

4. 2 thousands + 4 hundreds + 3 tens + 2 units.

5. 3 thousands + 4 tens + 7 units.

6. 5 thousands + 7 hundreds + 3 units.

7. 6 thousands + 4 tens.

8. 9 thousands + 3 units.

9. 5 thousands + 7 hundreds + 2 units.

10. Write in figures two thousand seventy-five and one thousand four hundred six ; add their sum to their difference.

11. Name instantly the sum and then the difference :

55	54	46	47	44	58	64	77
<u>30</u>	<u>40</u>	<u>30</u>	<u>20</u>	<u>40</u>	<u>20</u>	<u>30</u>	<u>20</u>

Copy and subtract ; check each answer by adding the difference to the smaller amount :

$$\begin{array}{r} 12. \quad \$1250.00 \\ \quad \quad 756.95 \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad \$4075.06 \\ \quad \quad 1948.95 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad \$5407.00 \\ \quad \quad 987.65 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad \$1000.00 \\ \quad \quad 875.85 \\ \hline \end{array}$$

Copy and add :

16. \$275.25	17. \$378.09	18. \$397.14	19. \$768.00
76.46	58.92	92.86	1.98
85.78	9.87	195.28	17.46
<u> </u>	<u> </u>	<u> </u>	<u> </u>

20. Start at 1 and add 4 and 5 in turn until the sum is 46; name results only.

Thus, 1, 5, 10, 14, etc.

21. Start at 51 and subtract 6 and 4 in turn until the result is 1.

Thus, 51, 45, 41, 35, etc.

22. Name at sight the answers:

2×7	2×9	3×6	3×7	3×9	3×8
4×6	4×9	4×8	4×7	4×12	3×12
5×9	5×7	5×12	6×7	6×9	6×8

Multiply rapidly the outer numbers by the inner:

23.



24.



25.



26. Name at sight the products:

10×11	11×11	12×12	12×9	10×17
12×11	20×7	12×8	30×9	12×7

27. Name the quotients at sight:

$12 \div 2$	$18 \div 2$	$12 \div 3$	$27 \div 3$	$21 \div 3$
$32 \div 4$	$36 \div 4$	$24 \div 4$	$48 \div 4$	$36 \div 3$

28. Name at sight $\frac{1}{5}$ of :

35; 55; 25; 40; 60; 15; 30.

29. Name at sight $\frac{1}{6}$ of :

36; 66; 24; 72; 42; 54; 48.

30. Name at sight $\frac{1}{7}$ of :

63; 35; 49; 84; 56; 28; 77.

31. Name at sight $\frac{1}{8}$ of :

72; 96; 64; 16; 32; 48; 56.

32. Name at sight $\frac{1}{9}$ of :

63; 108; 36; 72; 27; 81; 54.

33. State rapidly the answers :

$160 \div 10$	$200 \div 10$	$1000 \div 10$	$700 \div 100$
$5000 \div 100$	$80 \div 40$	$200 \div 50$	$500 \div 50$

34. Repeat the table of 8's, beginning with 8×12 .

35. Repeat the table of 9's, beginning with 9×12 .

36. A 50-cent piece is worth how many dimes?

37. A girl was given 40 words to spell; if she misspelled $\frac{1}{5}$ of them, how many did she spell correctly?

38. $\frac{1}{5}$ of 25 boys were absent from a class; how many were present?

39. How many hours did a laborer work during the month of July if he worked 12 hours each for 6 days, 10 hours each for 6 days, eleven hours each for 4 days, and 9 hours each for 6 days?

40. A farmer bought two cows, one for \$38 and the other for \$42. He sold them both for \$100; find his gain.

41. How many minutes are there in 24 hours?

42. How many hours are there from 8.30 P.M. to midnight?

43. How many square feet are there in a piece of paper 24 ft. long and 3 ft. wide?

44. How many yards are there in a 66-foot tape measure?

45. How many pecks of seed are there in a sack that contains 2 bu. 1 pk.?

46. I owed a \$30 store bill and paid $\frac{4}{5}$ of it; how much of the bill did I then owe?

47. If seven times a number is 56, what is 4 times the number? 6 times the number?

48. Find the cost of these poultry supplies:

One 50-lb. Bag Alfalfa Meal	\$ 1.25
One 100-lb. Bag Cut Clover Hay	2.25
One 100-lb. Bag Ground Oyster Shells	0.75
One 5-lb. Pkg. Ground Charcoal	0.30
Total	\$

CHAPTER III

NOTATION AND NUMERATION

1. 1. Beginning at the right, tell for what number each *one* stands:

1 1 1 1

2. How many ones make 1 ten?

3. How many tens make 1 hundred?

4. How many hundreds make 1 thousand?

2. Thousands are counted up to 999 thousand.

3. A thousand thousand is called a **million**, written 1,000,000.

4. Millions are counted up to 999 million.

5. A thousand million is called a **billion**, written 1,000,000,000.

6. When more than three figures are used to write a whole number, they may be separated by commas into groups, or **periods**, of three figures each.

7. Counting from the right:

In the first period any number of units from 1 to 999 is found.

In the second period any number of thousands from 1 to 999 is found.

In the third period any number of millions from 1 to 999 is found.

8.

Table

Billion		Hundred-millions		Hundred-thousands		Hundreds		
1	,	3	2	0	,	4	0	7
							0	6
								3
Billions		Millions		Thousands		Units		
4th period		3d period		2d period		1st period		

1,320,407,063 is read *one billion three hundred twenty million four hundred seven thousand sixty-three*.

9. To read a number, begin at the right and separate it into periods of three figures each ; then begin at the left, read the number in each period and give it the name of the period, except in units, where the name of the period is omitted.

10. Exercise:

Copy, point off into periods, and read :

1.	2.	3.	4.
11000	10100	11900	26038
18000	21400	12200	42135
84060	92000	50000	74264
100000	101365	784000	258930
596036	410687	856020	367425

5.	6.	7.
2000000	684160	99000
31509823	4053621	397044
530742965	400000000	1806049
678560	832146	973848
1460001	1468321	1487632
1200010	1480077	1000800
1034600	1768321	1000100
1601000	1010100	1760010

Write in figures :

3. Ten thousand ; two hundred twenty-two thousand.
9. Ninety-nine thousand nine hundred ; two million.
10. Forty-eight thousand ; two hundred two thousand.
11. Two hundred thousand ; fifty thousand two hundred.
12. Ten thousand two hundred ; fifty-four million.
13. One billion one hundred million ; two hundred twenty-six million.
14. One billion one hundred thousand.
15. One billion two hundred fourteen million one hundred twenty-five.
16. One billion six hundred million seven thousand fourteen.

Roman Notation

11. In the Roman system :

$$\begin{array}{llll} \text{I} = 1 & \text{V} = 5 & \text{X} = 10 & \text{L} = 50 \quad \text{C} = 100 \\ & \text{D} = 500 & & \text{M} = 1000 \end{array}$$

NOTE. The number for which a letter stands is called the value of the letter.

12. If a letter is repeated, its value is repeated.

Thus, II = 2; III = 3; XX = 20; CC = 200; MMM = 3000.

13. If a letter is written before one of greater value, the difference of their values is expressed.

Thus, IV = 4; IX = 9; XL = 40; XC = 90.

14. If a letter or a combination of letters is written after a letter of greater value, the sum of the values is expressed.

Thus, VI = 6; XIII = 13; LV = 55; LIX = 59.

15.

Table

UNITS		TENS		HUNDREDS	
I	= 1	X	= 10	C	= 100
II	= 2	XX	= 20	CC	= 200
III	= 3	XXX	= 30	CCC	= 300
IV	= 4	XL	= 40	CD	= 400
V	= 5	L	= 50	D	= 500
VI	= 6	LX	= 60	DC	= 600
VII	= 7	LXX	= 70	DCC	= 700
VIII	= 8	LXXX	= 80	DCCC	= 800
IX	= 9	XC	= 90	CM	= 900

16. In writing numbers other than those given in the table of Section 15, hundreds are written after thousands, tens after hundreds, and units after tens.

Thus, $1567 = 1000 + 500 + 60 + 7$ is written

$$\text{MDLXVII} = \text{M} + \text{D} + \text{LX} + \text{VII}.$$

NOTE. IIII = 4; XXXX = 40; CCCC = 400, are also in use.

17. Exercise :

Write by the Roman method :

1. The nine tens.
2. The nine hundreds.

Write by the Roman method the numbers between :

3. 30 and 40.
4. 60 and 70.
5. 90 and 100.

Write by the Roman method the following numbers :

- | | | |
|----------|----------|----------|
| 6. 1492 | 7. 1776 | 8. 1620 |
| 9. 1732 | 10. 1809 | 11. 1900 |
| 12. 1913 | 13. 1915 | 14. 1920 |

Write in figures :

- | | | |
|--------------|------------|---------------|
| 15. XIV | 16. XIX | 17. XC |
| 18. LXI | 19. LIX | 20. LXXXIV |
| 21. XCIH | 22. MCM | 23. XLIV |
| 24. MCMXXI | 25. MCMXVI | 26. MDCCCLXV |
| 27. MDCCCXII | 28. MCMIV | 29. MDCCLXXVI |

ADDITION

18. Addition is the process of uniting two or more numbers into one number called their **sum**.

19. Exercise :

Add at sight the following columns:

1.	5	} Look for groups and add the groups; group in tens when possible. Think $9 + 4 = 13$; then $13 + 10 = 23$; then $23 + 9 = 32$. Say 13, 23, 32.
	3	
	1	
	7	
	3	
	4	
	9	
	<u>32</u>	

2.	8	3.	2	4.	6	5.	5	6.	7	7.	9	8.	4	9.	3
	2		4		3		1		5		8		6		7
	5		4		1		4		3		2		8		5
	6		9		5		4		2		3		1		9
	3		2		4		6		4		7		3		6
	7		8		9		2		6		4		7		5
	9		3		7		8		1		6		5		2
	1		5		8		7		9		5		2		1
	4		7		2		3		8		1		9		4
	9		8		7		6		2		4		1		3
	<u> </u>		<u> </u>		<u> </u>		<u> </u>		<u> </u>		<u> </u>		<u> </u>		<u> </u>

Add at sight from left to right:

10. $2 + 3 + 5 + 7 + 3 + 8$

11. $8 + 2 + 6 + 1 + 3 + 9$

12. $3 + 4 + 3 + 5 + 4 + 1 + 4$

13. $4 + 7 + 6 + 4 + 5 + 3 + 2$

14. $8 + 2 + 4 + 3 + 2 + 1 + 7 + 3$

15. $9 + 1 + 8 + 7 + 4 + 6 + 5 + 4$

Name at sight each sum :

16. $40 + 20$ (Think 60)

17. $38 + 30$ (Think 68)

18. $45 + 52$ (Think 97)

19. $48 + 37$ (Think 48, 78, 85)

20. $20 + 10$

21. $38 + 20$

22. $39 + 30$

23. $40 + 50$

24. $46 + 30$

25. $58 + 40$

26. $64 + 40$

27. $76 + 50$

28. $68 + 70$

20. Exercise :

Copy and add :

1. 8640

2. 1914

3. 16,207

4. \$9.81

2573

864

31,403

4.07

5291

7

19,219

2.95

1037

21

10,107

9.63

5. 5672

6. 614

7. \$1.14

8. 21,008

3420

10

7.72

30,610

7641

5326

6.33

27,328

6020

227

3.50

33,009

8695

6

5.55

12,135

6407

32

8.86

41,681

Add upward ; add across ; check results :

$$9. \quad 234 + 567 + 728 = ?$$

$$109 + 106 + 34 = ?$$

$$48 + 729 + 138 = ?$$

$$\begin{array}{r} 234 + 567 + 728 \\ 109 + 106 + 34 \\ 48 + 729 + 138 \\ \hline ? + ? + ? = ? \end{array}$$

$$10. \quad 300 + 227 + 136 = ?$$

$$217 + 109 + 200 = ?$$

$$100 + 324 + 358 = ?$$

$$\begin{array}{r} 300 + 227 + 136 \\ 217 + 109 + 200 \\ 100 + 324 + 358 \\ \hline 445 + 122 + 609 = ? \\ ? + ? + ? = ? \end{array}$$

11. A man bought a horse for \$125 and sold it for \$25 more than he paid for it. What was the selling price?

12. A man paid \$25 for a suit of clothes, \$20 for an overcoat, \$3.50 for a pair of shoes, and \$3 for a hat. How much did he pay for all?

13. In January a man deposited \$12.50 in a postal savings bank ; in February, \$25 ; in March, \$20, and in April, \$22.50. How much did he deposit during the four months?

14. Find the entire weight of four loads of coal weighing, respectively, 2200 lb., 2256 lb., 2185 lb., and 2232 lb.

SUBTRACTION

21. Subtraction is the process of taking one number, called the **subtrahend**, from another number, called the **minuend** ; the result is called the **difference** or **remainder**

22. Exercise :

Name at sight the difference :

$$1. \quad \begin{array}{r} 70 \\ 40 \\ \hline \end{array}$$

$$2. \quad \begin{array}{r} 90 \\ 60 \\ \hline \end{array}$$

$$3. \quad \begin{array}{r} 96 \\ 30 \\ \hline \end{array}$$

$$4. \quad \begin{array}{r} 96 \\ 31 \\ \hline \end{array}$$

$$5. \quad \begin{array}{r} 48 \\ 36 \\ \hline \end{array}$$

6. 50	7. 600	8. 250	9. 375	10. 485
<u>39</u>	<u>200</u>	<u>100</u>	<u>200</u>	<u>250</u>

Copy and subtract :

11. 7276	12. 9029	13. 3278	14. 9301
<u>6182</u>	<u>8163</u>	<u>1347</u>	<u>7464</u>
15. 7400	16. 8000	17. 47563	18. 89576
<u>4763</u>	<u>6342</u>	<u>38365</u>	<u>88243</u>
19. \$ 2721	20. \$ 7000	21. \$ 84876	22. \$ 48010
<u>1987</u>	<u>4762</u>	<u>45987</u>	<u>19909</u>

23. This table shows the population in 1900 and in 1910 of the five cities named ; what was the increase in population for each city for the 10 years ?

YEAR	NEW YORK	CHICAGO	PHILADELPHIA	BOSTON	OKLAHOMA CITY
1910.	4,766,883	2,185,283	1,549,008	670,585	64,205
1900	3,437,202	1,698,575	1,293,697	560,892	10,037
Increase					

24. A man bought a lot for \$ 500 and sold it for \$ 675 ; how much did he gain ?

25. How much has a man left from his salary of \$ 900 after paying house rent amounting to \$ 216 ?

26. What must be added to 1756 to make 2000 ?

27. A wagon loaded with grain weighed 7640 lb.; the wagon weighed 1875 lb.; what was the weight of the grain?

28. A farmer's income for a certain year was \$1278.50 and his expenses were \$750.55; what was the balance?

29. At the beginning of a trip a trolley car register showed that 6107 fares had been collected and at the end of the trip 6298 fares; how many were collected during the trip?

30. The number of pianos made in the United States, in a recent year, was 261,197; 5 years later the number made was 374,154; what was the increase?

31. How much greater is 1,000,000 than 9999?

MULTIPLICATION

23. **Multiplication** is the process of taking a number called the **multiplicand**, additively, as many times as there are units in another number called the **multiplier**. The result in multiplication is called the **product**.

24. Exercise:

Name at sight the product:

- | | | | |
|-------------------|--------------------|-------------------|--------------------|
| 1. 9×7 | 2. 10×9 | 3. 12×8 | 4. 11×12 |
| 5. 12×7 | 6. 7×8 | 7. 12×10 | 8. 12×6 |
| 9. 11×11 | 10. 12×12 | 11. 12×9 | 12. 11×10 |

30	40	20	60	70	50	90	80
----	----	----	----	----	----	----	----

Multiply at sight each number above the line by:

- | | | | |
|-------|-------|-------|-------|
| 13. 2 | 14. 3 | 15. 4 | 16. 5 |
| 17. 6 | 18. 7 | 19. 8 | 20. 9 |

Multiply: 21. 48 by 2.

Think quickly: 2 times 40 are 80 and 2 times 8 are 16; 80 and 16 are 96.

- | | | |
|-------------|-------------|-------------|
| 22. 34 by 2 | 23. 45 by 2 | 24. 28 by 2 |
| 25. 24 by 3 | 26. 26 by 3 | 27. 42 by 3 |
| 28. 56 by 3 | 29. 44 by 4 | 30. 55 by 4 |
| 31. 64 by 4 | 32. 45 by 5 | 33. 36 by 5 |
| 34. 63 by 5 | 35. 16 by 6 | 36. 24 by 6 |
| 37. 35 by 6 | 38. 14 by 7 | 39. 23 by 7 |
| 40. 35 by 7 | 41. 16 by 8 | 42. 24 by 8 |
| 43. 25 by 8 | 44. 14 by 9 | 45. 25 by 9 |

Find the cost of:

46. 2 cans of tomatoes at 16 c a can.
47. 4 packages of raisins at 16 c a package.
48. 3 cans of salmon at 18 c a can.
49. 3 tea aprons at 25 c each.
50. 4 yd. of ribbon at 8 c a yard.
51. 3 window shades at 30 c each.
52. 3 cans of stove polish at 15 c each.
53. 2 bottles of olives at 50 c each.
54. 2 bottles of maple sirup at 35 c a bottle.
55. 3 cans of cherries at 30 c a can.
56. 3 glasses of jelly at 28 c a glass.

Multiply:

57. 2 by 35

Think quickly: 35 times 2 = 2 times 35, or 70.

58. 2 by 30

59. 2 by 50

60. 2 by 18

61. 2 by 48

62. 2 by 64

63. 3 by 30

64. 3 by 40

65. 3 by 52

66. 3 by 18

67. 4 by 20

68. 4 by 25

69. 4 by 32

70. 4 by 45

71. 4 by 60

72. 5 by 50

73. 5 by 14

74. 5 by 18

75. 5 by 24

76. 6 by 40

77. 6 by 14

78. 6 by 22

79. 7 by 50

80. 7 by 13

81. 8 by 80

82. 8 by 16

83. 9 by 60

84. 9 by 41

85. Find the cost of 40 yd. carpet at \$ 2 a yd.

Think: 40 times \$ 2 = 2 times \$ 40, or \$ 80.

Find the cost of:

86. 20 yd. silk at \$ 3 a yd.

87. 30 head of sheep at \$ 5 a head.

88. 13 quarts of chestnuts at 7¢ a quart.

89. 14 bbl. of apples at \$ 4 a bbl.

90. 16 qt. of milk at 6¢ a qt.

91. 9 cans of corn at 10¢ a can.

92. 18 lb. of corn meal at 3¢ a lb.

93. 14 lb. of rolled oats at 6¢ a lb.

94. 19 lb. of hominy at 5¢ a pound.

95. 15 lb. of beans at 6¢ a lb.
 96. 12 yd. of ribbon at 8¢ a yd.
 97. 13 yd. of lining at 6¢ a yd.
 98. 75 fruit trees at \$1 each.

Multipliers, Numbers of Two or of Three Figures

25. Multiply 465 by 359.

*This shows the complete work :**In practice write only this :*

	465	Multiplcand	465
	359	Multiplier	359
9 × 465 =	4185		4185
50 × 465 =	23250	(see Sec. 144, p. 166)	2325
300 × 465 =	139500		1395
359 × 465 =	166935	Product	166935

26. Exercise :

Copy and multiply :

1. 342	2. 456	3. 401	4. 523	5. 536
28	34	39	42	48
6. 497	7. 509	8. 599	9. 612	10. 607
51	57	69	63	98
11. 574	12. 676	13. 602	14. 731	15. 756
83	78	79	81	99
16. 706	17. 811	18. 839	19. 899	20. 908
59	67	73	86	95

21. $\begin{array}{r} 452 \\ 121 \\ \hline \end{array}$	22. $\begin{array}{r} 410 \\ 193 \\ \hline \end{array}$	23. $\begin{array}{r} 506 \\ 167 \\ \hline \end{array}$	24. $\begin{array}{r} 576 \\ 190 \\ \hline \end{array}$	25. $\begin{array}{r} 533 \\ 156 \\ \hline \end{array}$
26. $\begin{array}{r} 603 \\ 251 \\ \hline \end{array}$	27. $\begin{array}{r} 623 \\ 340 \\ \hline \end{array}$	28. $\begin{array}{r} 783 \\ 469 \\ \hline \end{array}$	29. $\begin{array}{r} 755 \\ 499 \\ \hline \end{array}$	30. $\begin{array}{r} 706 \\ 518 \\ \hline \end{array}$

31. Multiply 978 by 206.

This shows the complete work:

$$\begin{array}{r}
 978 \\
 206 \\
 \hline
 6 \times 978 = 5868 \\
 200 \times 978 = 195600 \text{ (see Section 144, p. 166)} \\
 206 \times 978 = 201468
 \end{array}$$

In practice write only this:

$$\begin{array}{r}
 978 \\
 206 \\
 \hline
 5868 \\
 1956 \\
 \hline
 201468
 \end{array}$$

32. $\begin{array}{r} 342 \\ 209 \\ \hline \end{array}$	33. $\begin{array}{r} 369 \\ 108 \\ \hline \end{array}$	34. $\begin{array}{r} 309 \\ 406 \\ \hline \end{array}$	35. $\begin{array}{r} 468 \\ 305 \\ \hline \end{array}$	36. $\begin{array}{r} 470 \\ 505 \\ \hline \end{array}$
37. $\begin{array}{r} 517 \\ 501 \\ \hline \end{array}$	38. $\begin{array}{r} 588 \\ 703 \\ \hline \end{array}$	39. $\begin{array}{r} 677 \\ 708 \\ \hline \end{array}$	40. $\begin{array}{r} 602 \\ 605 \\ \hline \end{array}$	41. $\begin{array}{r} 735 \\ 803 \\ \hline \end{array}$
42. $\begin{array}{r} 698 \\ 109 \\ \hline \end{array}$	43. $\begin{array}{r} 770 \\ 408 \\ \hline \end{array}$	44. $\begin{array}{r} 846 \\ 509 \\ \hline \end{array}$	45. $\begin{array}{r} 968 \\ 702 \\ \hline \end{array}$	46. $\begin{array}{r} 936 \\ 904 \\ \hline \end{array}$
47. $\begin{array}{r} 1435 \\ 233 \\ \hline \end{array}$	48. $\begin{array}{r} 1623 \\ 342 \\ \hline \end{array}$	49. $\begin{array}{r} 2130 \\ 367 \\ \hline \end{array}$	50. $\begin{array}{r} 2316 \\ 287 \\ \hline \end{array}$	51. $\begin{array}{r} 2265 \\ 411 \\ \hline \end{array}$
52. $\begin{array}{r} 2115 \\ 521 \\ \hline \end{array}$	53. $\begin{array}{r} 1388 \\ 416 \\ \hline \end{array}$	54. $\begin{array}{r} 3120 \\ 323 \\ \hline \end{array}$	55. $\begin{array}{r} 2346 \\ 422 \\ \hline \end{array}$	56. $\begin{array}{r} 2407 \\ 341 \\ \hline \end{array}$
57. $\begin{array}{r} 2311 \\ 102 \\ \hline \end{array}$	58. $\begin{array}{r} 2065 \\ 206 \\ \hline \end{array}$	59. $\begin{array}{r} 3108 \\ 209 \\ \hline \end{array}$	60. $\begin{array}{r} 3222 \\ 304 \\ \hline \end{array}$	61. $\begin{array}{r} 2416 \\ 303 \\ \hline \end{array}$

62. 1560	63. 2155	64. 3110	65. 2504	66. 3089
<u>207</u>	<u>309</u>	<u>206</u>	<u>305</u>	<u>202</u>

27. Exercise :

1. What should 56 bu. of wheat weigh, if one bushel weighs 60 lb.?

2. A barrel of salt weighs 280 lb.; what should a wagon loaded with 10 barrels of salt weigh, if the wagon weighs 1756 lb.?

3. What is the weight of 28 bu. of turnips, if they weigh 55 lb. to the bushel?

4. Find the weight of 12 bales of cotton, each bale weighing 500 lb.

5. If a man takes 1760 steps in walking a mile, how many steps of the same length should he take in walking 12 miles?

6. Find the cost of a farm of 85 acres at \$ 65 per acre.

7. How many minutes are there in a week?

8. How many pounds of fertilizer should be sown on 18 acres if 400 lb. are sown to the acre?

9. At the rate of \$ 7500 per mile, what should be the cost of making 15 miles of good roads?

10. If a man's salary is \$ 1200 per year and his expenses \$ 75 per month, how much has he left at the end of the year, provided that he saves the remainder?

11. A ton of coal in Pennsylvania at the mines weighs 2240 lb.; what is the weight of 15 tons?

DIVISION

28. Division is the process of finding one of the equal parts of a number or how many times one number is contained in another. The answer is called the **quotient**; the number divided is called the **dividend**; the number by which we divide is called the **divisor**, and the undivided part of the dividend is called the **remainder**.

29. Exercise :

Name rapidly the quotient and the remainder in each :

- | | | | | |
|------------------------|------------------------|------------------------|------------------------|------------------------|
| 1. $6 \overline{)41}$ | 2. $6 \overline{)50}$ | 3. $6 \overline{)56}$ | 4. $6 \overline{)59}$ | 5. $6 \overline{)47}$ |
| 6. $7 \overline{)44}$ | 7. $7 \overline{)51}$ | 8. $7 \overline{)55}$ | 9. $7 \overline{)61}$ | 10. $7 \overline{)65}$ |
| 11. $7 \overline{)69}$ | 12. $8 \overline{)50}$ | 13. $8 \overline{)55}$ | 14. $8 \overline{)59}$ | 15. $8 \overline{)62}$ |
| 16. $8 \overline{)66}$ | 17. $8 \overline{)71}$ | 18. $8 \overline{)76}$ | 19. $8 \overline{)79}$ | 20. $9 \overline{)65}$ |
| 21. $9 \overline{)70}$ | 22. $9 \overline{)74}$ | 23. $9 \overline{)79}$ | 24. $9 \overline{)58}$ | 25. $9 \overline{)83}$ |
| 26. $9 \overline{)49}$ | 27. $9 \overline{)86}$ | 28. $9 \overline{)69}$ | 29. $9 \overline{)84}$ | 30. $9 \overline{)75}$ |

Name rapidly the quotient in each :

- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 31. $11 \overline{)132}$ | 32. $12 \overline{)108}$ | 33. $12 \overline{)144}$ | 34. $11 \overline{)99}$ |
| 35. $11 \overline{)121}$ | 36. $12 \overline{)96}$ | 37. $11 \overline{)110}$ | 38. $12 \overline{)84}$ |
| 39. $12 \overline{)60}$ | 40. $12 \overline{)72}$ | 41. $12 \overline{)132}$ | 42. $12 \overline{)120}$ |

Dividing by Numbers of Two Figures Each; Quotient, a Number of One Figure

30. Divide 98 by 32.

		98 = 9 tens + 8 units.
		9 tens $\div$ 32 is 0 tens (9 is less than 32).
3 Quotient		9 tens + 8 units = 98 units.
Divisor 32	98 Dividend	98 units $\div$ 32 (estimate $9 \div 3$) = 3
	96	units.
	2	Remainder
Check:	$32 \times 3 + 2 = 98$.	
	Write 3 over the units.	
	Taking 32 $\times$ 3 units from 98 units the remainder is 2.	

In practice, estimate the quotient figure ($9 \div 3 = 3$), multiply 32 by 3, and subtract the product from 98.

31. Exercise:

Copy and divide (estimate the quotient figure):

- | | | | |
|-------------------------|-------------------------|-------------------------|-------------------------|
| 1. $20\overline{)60}$ | 2. $21\overline{)84}$ | 3. $14\overline{)28}$ | 4. $21\overline{)63}$ |
| 5. $22\overline{)88}$ | 6. $21\overline{)86}$ | 7. $31\overline{)68}$ | 8. $22\overline{)89}$ |
| 9. $30\overline{)96}$ | 10. $42\overline{)87}$ | 11. $50\overline{)105}$ | 12. $63\overline{)129}$ |
| 13. $42\overline{)129}$ | 14. $61\overline{)188}$ | 15. $50\overline{)459}$ | 16. $11\overline{)58}$ |
| 17. $21\overline{)73}$ | 18. $22\overline{)96}$ | 19. $31\overline{)105}$ | 20. $42\overline{)179}$ |
| 21. $52\overline{)117}$ | 22. $63\overline{)256}$ | 23. $54\overline{)175}$ | 24. $44\overline{)189}$ |
| 25. $53\overline{)495}$ | 26. $62\overline{)568}$ | 27. $73\overline{)570}$ | 28. $84\overline{)590}$ |
| 29. $82\overline{)660}$ | 30. $94\overline{)380}$ | 31. $95\overline{)500}$ | 32. $94\overline{)580}$ |

32. Divide 174 by 39.

$$\begin{array}{r} 4 \\ 39 \overline{)174} \\ \underline{156} \\ 18 \end{array}$$

SUGGESTION. Since 39 is nearly 40, estimate $17 \div 4$ for the quotient figure.

Check: $39 \times 4 + 18 = 174$.

33. Exercise :

Copy and divide (estimate the quotient figure):

- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. $19 \overline{)46}$ | 2. $19 \overline{)63}$ | 3. $18 \overline{)60}$ | 4. $18 \overline{)86}$ |
| 5. $19 \overline{)89}$ | 6. $27 \overline{)60}$ | 7. $27 \overline{)76}$ | 8. $28 \overline{)92}$ |
| 9. $28 \overline{)81}$ | 10. $29 \overline{)95}$ | 11. $27 \overline{)121}$ | 12. $28 \overline{)156}$ |
| 13. $29 \overline{)185}$ | 14. $38 \overline{)176}$ | 15. $39 \overline{)248}$ | 16. $48 \overline{)250}$ |
| 17. $48 \overline{)365}$ | 18. $49 \overline{)314}$ | 19. $48 \overline{)360}$ | 20. $49 \overline{)400}$ |
| 21. $57 \overline{)300}$ | 22. $58 \overline{)360}$ | 23. $58 \overline{)432}$ | 24. $59 \overline{)431}$ |
| 25. $59 \overline{)540}$ | 26. $67 \overline{)210}$ | 27. $67 \overline{)291}$ | 28. $68 \overline{)354}$ |
| 29. $69 \overline{)570}$ | 30. $69 \overline{)641}$ | 31. $77 \overline{)320}$ | 32. $77 \overline{)491}$ |
| 33. $78 \overline{)485}$ | 34. $78 \overline{)650}$ | 35. $79 \overline{)721}$ | 36. $87 \overline{)195}$ |
| 37. $88 \overline{)275}$ | 38. $89 \overline{)730}$ | 39. $87 \overline{)645}$ | 40. $89 \overline{)820}$ |

34. Divide 156 by 54.

$$\begin{array}{r} 2 \\ 54 \overline{)156} \\ \underline{108} \\ 48 \end{array}$$

SUGGESTION. The estimate ($15 \div 5 = 3$) is too high since 3×54 , or 162, is more than 156.

Change the estimate to 2

Check: $54 \times 2 + 48 = 156$.

35. Exercise :

Copy and divide (estimate the quotient figure):

- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. $13 \overline{)40}$ | 2. $14 \overline{)48}$ | 3. $15 \overline{)47}$ | 4. $21 \overline{)60}$ |
| 5. $23 \overline{)42}$ | 6. $22 \overline{)80}$ | 7. $23 \overline{)65}$ | 8. $24 \overline{)90}$ |
| 9. $32 \overline{)90}$ | 10. $34 \overline{)65}$ | 11. $21 \overline{)101}$ | 12. $22 \overline{)102}$ |
| 13. $24 \overline{)168}$ | 14. $32 \overline{)120}$ | 15. $34 \overline{)156}$ | 16. $34 \overline{)250}$ |
| 17. $33 \overline{)275}$ | 18. $35 \overline{)162}$ | 19. $34 \overline{)280}$ | 20. $32 \overline{)283}$ |
| 21. $43 \overline{)168}$ | 22. $44 \overline{)175}$ | 23. $43 \overline{)289}$ | 24. $44 \overline{)296}$ |
| 25. $43 \overline{)367}$ | 26. $52 \overline{)103}$ | 27. $54 \overline{)150}$ | 28. $51 \overline{)151}$ |
| 29. $53 \overline{)142}$ | 30. $52 \overline{)460}$ | 31. $64 \overline{)121}$ | 32. $63 \overline{)185}$ |
| 33. $65 \overline{)190}$ | 34. $63 \overline{)492}$ | 35. $64 \overline{)312}$ | 36. $72 \overline{)142}$ |
| 37. $73 \overline{)140}$ | 38. $74 \overline{)220}$ | 39. $75 \overline{)368}$ | 40. $74 \overline{)574}$ |

41. $84 \overline{)165}$ 42. $84 \overline{)250}$ 43. $82 \overline{)490}$ 44. $84 \overline{)500}$
45. $83 \overline{)730}$ 46. $91 \overline{)180}$ 47. $92 \overline{)365}$ 48. $93 \overline{)275}$

36. Exercise :

1. A man paid a debt of \$125 with 25 bills of equal value; what was the value of each bill?

2. What were the wages of a laborer per week, if he was paid \$135 for 15 weeks' work?

3. A drover bought 45 sheep for \$225; how much was that for each sheep?

4. A boy deposited \$84 in a postals savings bank in 12 months; how much was that per month?

5. If a boat goes 216 mi. in 24 hr., what average distance does it go each hour?

6. A farmer planted 252 trees in 28 rows, the same number of trees in each row; how many trees did he plant in each row?

7. How many loads did a farmer make of 384 bu. of wheat if he hauled 48 bu. at each load?

384 bu. was the amount he hauled.

48 bu. was the amount he hauled at each load.

$384 \div 48$, or $?$ = the number of loads.

8. How many feet are there in 108 in.?

9. For how many months will \$175 pay the rent of a house which rents for \$25 a month?

10. 260 lb. of oats make how many bushels and how many pounds over, counting 32 lb. to the bushel?

11. In 100 in. there are how many feet and how many inches over?

12. There are 32 qt. in 1 bu.; how many bushels are there in 256 qt.?

13. In how many months will a laborer earn \$245 at \$35 per month?

Dividing by Numbers of Two or more Figures Each; Quotient, a Number of more than One Figure

37. Divide 758 by 21.

$$\begin{array}{r}
 36 \\
 21 \overline{)758} \\
 \underline{63} \\
 128 \\
 \underline{126} \\
 2
 \end{array}
 \quad
 \begin{array}{l}
 758 = 7 \text{ hundreds} + 5 \text{ tens} + 8 \text{ units.} \\
 7 \text{ hundreds} \div 21 = 0 \text{ hundreds (21 is} \\
 \text{greater than 7).} \\
 7 \text{ hundreds} + 5 \text{ tens} = 75 \text{ tens.} \\
 75 \text{ tens} \div 21 \text{ (estimate } 7 \div 2) = 3 \text{ tens.} \\
 \text{Write 3 over the tens.}
 \end{array}$$

$21 \times 3 \text{ tens} = 63 \text{ tens.}$

$75 \text{ tens} - 63 \text{ tens} = 12 \text{ tens.}$

$12 \text{ tens} + 8 \text{ units} = 128 \text{ units.}$

$128 \text{ units} \div 21 \text{ (estimate } 12 \div 2) = 6 \text{ units.}$

Write 6 over the units. $21 \times 6 \text{ units} = 126 \text{ units.}$

$128 \text{ units} - 126 \text{ units} = 2 \text{ units.}$

The quotient is 36 and the remainder is 2.

Check: $21 \times 36 + 2 = 758.$

In practice think:

$75 \div 21 \text{ (estimate } 7 \div 2) = 3$; write 3 over the tens; $3 \times 21 = 63$;
 $75 - 63 = 12$; bring down 8; $128 \div 21 \text{ (estimate } 12 \div 2) = 6$; write
 6 over the units; $6 \times 21 = 126$; $128 - 126 = 2$.

38. Exercise:

Copy and divide (estimate the quotient figures):

1. $11 \overline{)136}$ 2. $11 \overline{)259}$ 3. $11 \overline{)584}$ 4. $11 \overline{)896}$

5. $11\overline{)958}$ 6. $21\overline{)347}$ 7. $21\overline{)768}$ 8. $21\overline{)978}$
 9. $22\overline{)958}$ 10. $22\overline{)1998}$ 11. $31\overline{)986}$ 12. $32\overline{)2099}$
 13. $32\overline{)2690}$ 14. $32\overline{)2058}$ 15. $32\overline{)2886}$ 16. $42\overline{)897}$
 17. $43\overline{)1897}$ 18. $42\overline{)3151}$ 19. $42\overline{)3997}$ 20. $44\overline{)3599}$
 21. $52\overline{)1987}$ 22. $52\overline{)3989}$ 23. $51\overline{)4489}$ 24. $53\overline{)4499}$
 25. $54\overline{)4490}$ 26. $61\overline{)2966}$ 27. $63\overline{)3481}$ 28. $64\overline{)6375}$
 29. $63\overline{)5298}$ 30. $62\overline{)5900}$ 31. $72\overline{)6139}$ 32. $73\overline{)4915}$
 33. $73\overline{)6298}$ 34. $74\overline{)6900}$ 35. $75\overline{)6270}$ 36. $84\overline{)4500}$

39. Divide 1351 by 29.

46	1351 = 1 thousand + 3 hundreds + 5 tens + 1 unit.
29 $\overline{)1351}$	1 thousand $\div$ 29 = 0 thousands (29 is greater
116	than 1). 13 hundreds $\div$ 29 = 0 hundreds (29 is
191	greater than 13). 135 tens $\div$ 29 (estimate 13 $\div$ 3,
174	since 29 is nearly 30) = 4 tens.
17	Multiply, subtract (notice that 19 is less than 29),
	and bring down; 191 units $\div$ 29 (estimate 19 $\div$ 3) =
	6 units.

Multiply and subtract (notice that 17 is less than 29).

Check: $29 \times 46 + 17 = 1351$.

In practice think:

$135 \div 29$ (estimate $13 \div 3$) = 4; write 4 over the tens; $4 \times 29 = 116$; $135 - 116 = 19$; bring down 1; $191 \div 29$ (estimate $19 \div 3$) = 6; write 6 over the units; $6 \times 29 = 174$; $191 - 174 = 17$.

40. Exercise:

Copy and divide (estimate the quotient figures):

- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. $19\overline{)610}$ | 2. $18\overline{)406}$ | 3. $19\overline{)256}$ | 4. $18\overline{)426}$ |
| 5. $19\overline{)486}$ | 6. $17\overline{)405}$ | 7. $28\overline{)370}$ | 8. $29\overline{)900}$ |
| 9. $28\overline{)682}$ | 10. $37\overline{)453}$ | 11. $37\overline{)1680}$ | 12. $38\overline{)2060}$ |
| 13. $29\overline{)2460}$ | 14. $39\overline{)3200}$ | 15. $38\overline{)3621}$ | 16. $47\overline{)1090}$ |
| 17. $48\overline{)3083}$ | 18. $49\overline{)4023}$ | 19. $49\overline{)4500}$ | 20. $49\overline{)4409}$ |
| 21. $57\overline{)1203}$ | 22. $58\overline{)2440}$ | 23. $59\overline{)3601}$ | 24. $59\overline{)4254}$ |
| 25. $59\overline{)5440}$ | 26. $69\overline{)2140}$ | 27. $66\overline{)2124}$ | 28. $67\overline{)4900}$ |
| 29. $68\overline{)3540}$ | 30. $69\overline{)6490}$ | 31. $78\overline{)2420}$ | 32. $79\overline{)4031}$ |
| 33. $77\overline{)3240}$ | 34. $79\overline{)6490}$ | 35. $78\overline{)7210}$ | 36. $87\overline{)3664}$ |
| 37. $86\overline{)2960}$ | 38. $88\overline{)4982}$ | 39. $89\overline{)7665}$ | 40. $89\overline{)8899}$ |

41. Divide 3684 by 64.

$$\begin{array}{r}
 57 \\
 64 \overline{)3684} \\
 \underline{320} \\
 484 \\
 \underline{448} \\
 36
 \end{array}$$

368 tens $\div$ 64 (estimate $36 \div 6$) = 6 tens.

But 64×6 tens, or 384 tens, is greater than 368 tens; hence, change the estimate to 5, which is the correct estimate.

Multiply, subtract, bring down.

484 units $\div$ 64 (estimate $48 \div 6$) = 8.

But 64×8 units, or 512 units, is greater than 484 units; hence, change the estimate to 7, which is the correct estimate.

Multiply and subtract.

Check: $64 \times 57 + 36 = 3684$.

42. Exercise :

Copy and divide (estimate the quotient figures) :

1. $14 \overline{)176}$ 2. $14 \overline{)275}$ 3. $15 \overline{)546}$ 4. $16 \overline{)476}$

5. $14 \overline{)710}$ 6. $26 \overline{)489}$ 7. $26 \overline{)514}$ 8. $25 \overline{)468}$

9. $24 \overline{)882}$ 10. $24 \overline{)426}$ 11. $25 \overline{)876}$ 12. $35 \overline{)634}$

13. $36 \overline{)935}$ 14. $34 \overline{)967}$ 15. $35 \overline{)575}$ 16. $25 \overline{)1625}$

17. $24 \overline{)1725}$ 18. $36 \overline{)1563}$ 19. $34 \overline{)1660}$ 20. $36 \overline{)2154}$

21. $37 \overline{)2156}$ 22. $44 \overline{)1714}$ 23. $43 \overline{)1615}$ 24. $45 \overline{)2965}$

25. $44 \overline{)3738}$ 26. $54 \overline{)1613}$ 27. $54 \overline{)4161}$ 28. $55 \overline{)1037}$

29. $55 \overline{)4712}$ 30. $52 \overline{)3006}$ 31. $66 \overline{)1212}$ 32. $65 \overline{)3630}$

33. $65 \overline{)4286}$ 34. $66 \overline{)5596}$ 35. $67 \overline{)4276}$ 36. $76 \overline{)1437}$

37. $76 \overline{)2944}$ 38. $74 \overline{)2115}$ 39. $73 \overline{)6407}$ 40. $74 \overline{)6342}$

41. $84 \overline{)1643}$ 42. $84 \overline{)6387}$ 43. $85 \overline{)6559}$ 44. $86 \overline{)5721}$

45. $83 \overline{)5723}$ 46. $94 \overline{)3748}$ 47. $94 \overline{)8346}$ 48. $95 \overline{)4600}$

49. $85 \overline{)4876}$ 50. $86 \overline{)5732}$ 51. $94 \overline{)8275}$ 52. $96 \overline{)8348}$

53. $86 \overline{)6672}$ 54. $85 \overline{)7310}$ 55. $95 \overline{)7363}$ 56. $96 \overline{)8432}$

43. Divide 25494 by 42.

$ \begin{array}{r} 607 \\ 42 \overline{)25494} \\ \underline{252} \\ 294 \\ \underline{294} \\ 0 \end{array} $	254 hundreds $\div 42$ (estimate $25 \div 4$) = 6 hundreds; write 6 over the hundreds. Multiply, subtract, and bring down; 29 tens $\div 42$ (estimate $2 \div 4$) = 0 tens; write 0 over the tens. Bring down 4, the next figure of the dividend. 294 units $\div 42$ = 7 units. Multiply and subtract; the remainder is 0.
--	---

Check: $42 \times 607 = 25494$.

In practice think:

$254 \div 42$ (estimate $25 \div 4$) = 6; write 6 over hundreds; $6 \times 42 = 252$; $254 - 252 = 2$; bring down 9; $29 \div 42$ (estimate $2 \div 4$) = 0; write 0 over tens; bring down 4; $294 \div 42$ (estimate $29 \div 4$) = 7; write 7 over units; $7 \times 42 = 294$; $294 - 294 = 0$.

44. Exercise:

Copy and divide:

- | | | |
|----------------------------|----------------------------|----------------------------|
| 1. $21 \overline{)5775}$ | 2. $22 \overline{)7612}$ | 3. $21 \overline{)6384}$ |
| 4. $22 \overline{)8954}$ | 5. $31 \overline{)9517}$ | 6. $25 \overline{)7850}$ |
| 7. $29 \overline{)8874}$ | 8. $26 \overline{)8034}$ | 9. $32 \overline{)6688}$ |
| 10. $32 \overline{)6336}$ | 11. $31 \overline{)3973}$ | 12. $32 \overline{)3461}$ |
| 13. $27 \overline{)6620}$ | 14. $43 \overline{)8950}$ | 15. $44 \overline{)9817}$ |
| 16. $22 \overline{)20049}$ | 17. $24 \overline{)18249}$ | 18. $25 \overline{)24758}$ |
| 19. $54 \overline{)16701}$ | 20. $55 \overline{)17441}$ | 21. $60 \overline{)18001}$ |
| 22. $67 \overline{)27239}$ | 23. $79 \overline{)49798}$ | 24. $81 \overline{)57443}$ |

25. $97 \overline{)59080}$

26. $135 \overline{)2160}$

27. $205 \overline{)6560}$

28. $182 \overline{)8190}$

29. $807 \overline{)8139}$

30. $112 \overline{)8529}$

31. $249 \overline{)13450}$

32. $347 \overline{)19533}$

33. $506 \overline{)86637}$

45. Exercise :

1. When a field of 24 acres yields 504 bu. of wheat, how much is the yield to the acre?

SUGGESTION. $504 \text{ bu.} \div 24$, or ——— bu., = the yield of each acre.

2. A man who pays \$240 rent per year pays how much rent per month?

3. A man traveled 1008 miles in 21 hours; what was the average distance he traveled per hour?

4. A ranchman sold 85 head of cattle for \$2125; what was the average price per head?

5. 3500 lb. of fertilizer were sowed on 14 acres; how much was that to the acre?

6. A farm of 81 acres was sold for \$5265; what was the selling price of each acre?

7. A teamster hauled 650 ties in 26 loads of equal size; how many ties to the load?

8. A dealer shipped 1296 doz. eggs in 18 crates of equal size. How many dozen were there in each crate?

9. Corn weighs 56 lb. to the bushel. A farmer's crop weighed 8568 lb.; how many bushels had he?

SUGGESTION. $8568 \div 56$, or ———, = the number of bushels.

10. How many feet are there in 1728 inches?

11. There are 32 qt. in a bushel; how many bushels are there in 800 qt.?

12. Wheat weighs 60 lb. to the bushel. A farmer's crop weighed 6200 lb.; how many bushels had he, and how many pounds over?

13. A clerk who saves \$ 25 a month will save \$ 1000 in how many months?

14. 864 fruit trees are planted in rows of 24 trees each; how many rows are there?

15. A mail carrier who drives 25 miles per day drives 1000 miles in what time?

REVIEW

46. Exercise :

1. Read :

The total quantity of cotton shipped from the United States during a recent year amounted to 8,067,882 bales of 500 pounds each, valued at \$585,318,869. Of this cotton 3,461,054 bales went to Great Britain, 2,202,707 bales to Germany, and 1,021,998 bales to France.

2. What number is 1 less than 1000?

3. What number is 1 less than 10,000?

4. What number is 1 less than 100,000?

5. What number is 1 less than 1,000,000?

6. The following table shows the number of bushels of grain shipped from a certain depot during one week; copy and fill in the totals:

GRAIN	MON.	TUES.	WED.	THUR.	FRI.	SAT.	TOTAL
Wheat . . .	506	621	453	786	399	375	
Corn . . .	250	783	575	493	296	492	
Oats . . .	393	294	196	309	245	326	
Rye . . .	56	93	87	55	47	79	
Total . .							

Multiply across; add down:

7. $67 \times 125 = ?$

8. $89 \times 261 = ?$

$67 \times 367 = ?$

$89 \times 375 = ?$

$67 \times 891 = ?$

$89 \times 684 = ?$

$67 \times 496 = ?$

$89 \times 957 = ?$

$67 \times ? = ?$

$89 \times ? = ?$

Give the quotients at sight:

9. $60 \div 30;$

$100 \div 20;$

$200 \div 10.$

10. $80 \div 40;$

$120 \div 60;$

$150 \div 50.$

11. $90 \div 30;$

$160 \div 80;$

$360 \div 30.$

12. $590 \div 10;$

$270 \div 10;$

$560 \div 10.$

13. $2500 \div 100;$

$1700 \div 100;$

$3500 \div 100.$

14. A man bought a lot for \$750 and built on it a house that cost \$4755. He sold house and lot for \$6000; what was his profit?

15. A man owned 780 acres of land and sold 250 acres to one man and 165 acres to another; how much had he left?

16. A man owed a debt of \$1200. He paid at one time \$275, at another time \$180, and at another time \$425; how much did he then owe?

17. At the close of June, how many more days are left of the year?

18. The distance from New York to San Francisco is 3250 miles and the distance from San Francisco to Manila is 6789 miles; what is the distance from New York to Manila by way of San Francisco?

19. $2740 + 896 + 4212 + ? = 10,000$.

20. The population of Richmond, Va., in 1900 was 85,050; in 1910 it was 127,628; what was the increase for the ten years?

21. Corn weighs 56 lb. to the bushel; how many bushels are there in a load weighing 2240 lb.?

22. A hospital wished to raise a fund of \$2000. Four persons contributed \$100 each, three \$250 each, and the rest was made up of \$50 contributions; how many of these were there?

23. Find the cost of 1200 rails at \$14 per hundred.

24. How many \$20 bills will make \$1000?

FRACTIONS

Introductory Exercises and Definitions

Halves, Fourths, and Eighths

47. Exercise :

1. Line AB is divided into how many equal parts?



Each of the two equal parts of one is called **one half** ($\frac{1}{2}$).

2. How many halves are there in 1?
3. CD is divided into how many equal parts?



Each of the four equal parts of 1 is called **one fourth** ($\frac{1}{4}$).

4. What are 2 of the 4 equal parts of 1 called? 3 of them? 4 of them?
5. How many fourths are there in 1?
6. Read: $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, $\frac{4}{4}$.
7. EF is divided into how many equal parts?



Each of the eight equal parts of 1 is called **one eighth** ($\frac{1}{8}$).

8. What are 2 of the 8 equal parts of 1 called? 4 of them? 7 of them? 3 of them? 5 of them? 6 of them?
9. How many eighths are there in 1?
10. Read: $\frac{1}{8}$, $\frac{2}{8}$, $\frac{3}{8}$, $\frac{4}{8}$, $\frac{5}{8}$, $\frac{6}{8}$, $\frac{7}{8}$, $\frac{8}{8}$.

11. What is $\frac{1}{2}$ of $\frac{1}{2}$? $\frac{1}{2}$ of $\frac{1}{4}$?



12. How many fourths are there in $\frac{1}{2}$? How many eighths?

13. How many fourths are there in $\frac{2}{2}$? How many eighths?

14. How many fourths are there in $\frac{4}{8}$? How many halves?

15. How many eighths are there in $\frac{1}{4}$? in $\frac{1}{2}$? in $\frac{3}{4}$?

16. Read, supplying the missing numbers:

$$1 = \frac{2}{2}$$

$$1 = \frac{4}{4}$$

$$\frac{1}{2} = \frac{4}{8}$$

$$1 = \frac{8}{8}$$

$$\frac{1}{2} = \frac{4}{8}$$

$$\frac{1}{4} = \frac{2}{8}$$

$$\frac{2}{4} = \frac{4}{8}$$

$$\frac{3}{4} = \frac{6}{8}$$

$$2 = \frac{8}{4}$$

$$1\frac{1}{2} = \frac{3}{2}$$

$$2 = \frac{8}{4}$$

$$\frac{6}{8} = \frac{3}{4}$$

$$\frac{8}{8} = \frac{4}{4}$$

$$\frac{2}{8} = \frac{1}{4}$$

$$\frac{4}{4} = \frac{2}{2}$$

$$\frac{2}{4} = \frac{1}{2}$$

$$\frac{8}{4} = \frac{2}{1}$$

$$\frac{1}{2} \text{ of } \frac{1}{2} =$$

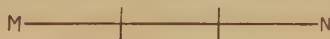
$$\frac{1}{2} \text{ of } \frac{1}{4} =$$

$$\frac{1}{4} \text{ of } \frac{1}{2} =$$

Thirds, Sixths, and Twelfths

48. Exercise:

1. Line MN is divided into how many equal parts?



Each of the 3 equal parts of 1 is called **one third** ($\frac{1}{3}$).

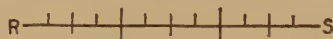
2. What are 2 of the 3 equal parts of 1 called? 3 of them?

3. How many thirds are there in 1?
4. Read: $\frac{1}{3}$, $\frac{2}{3}$, $\frac{3}{3}$.
5. PQ is divided into how many equal parts?



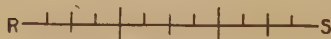
Each of the 6 equal parts of 1 is called **one sixth** ($\frac{1}{6}$).

6. What are 2 of the 6 equal parts of 1 called? 3 of them? 5 of them?
7. How many sixths are there in 1?
8. Read: $\frac{3}{6}$, $\frac{5}{6}$, $\frac{4}{6}$, $\frac{6}{6}$, $\frac{1}{6}$, $\frac{2}{6}$.
9. RS is divided into how many equal parts?



Each of the 12 equal parts of 1 is called **one twelfth** ($\frac{1}{12}$).

10. What are 2 of the 12 equal parts of 1 called? 5 of them? 6 of them? 8 of them? 9 of them?
11. How many twelfths are there in 1?
12. Read: $\frac{5}{12}$, $\frac{3}{12}$, $\frac{7}{12}$, $\frac{8}{12}$, $\frac{9}{12}$, $\frac{6}{12}$.
13. What is $\frac{1}{2}$ of $\frac{1}{3}$? $\frac{1}{2}$ of $\frac{1}{6}$?



14. How many sixths are there in $\frac{1}{3}$? How many twelfths?

15. How many sixths are there in $\frac{2}{3}$? How many twelfths?

16. How many sixths are there in $\frac{1}{2}$? How many twelfths?

17. How many twelfths are there in $\frac{1}{4}$? in $\frac{3}{4}$?

18. Read, supplying the missing numbers:

$1 = \frac{1}{3}$	$1 = \frac{1}{6}$	$1 = \frac{1}{12}$	$\frac{1}{3} = \frac{1}{6}$
$\frac{2}{3} = \frac{1}{6}$	$\frac{1}{3} = \frac{1}{12}$	$\frac{2}{3} = \frac{1}{12}$	$\frac{5}{6} = \frac{1}{12}$
$\frac{2}{6} = \frac{1}{3}$	$\frac{3}{6} = \frac{1}{2}$	$\frac{3}{12} = \frac{1}{4}$	$\frac{9}{12} = \frac{1}{4}$
$\frac{4}{12} = \frac{1}{3}$	$\frac{8}{12} = \frac{1}{3}$	$\frac{4}{6} = \frac{1}{3}$	$\frac{6}{12} = \frac{1}{2}$
$\frac{3}{3} = \frac{1}{6}$	$\frac{3}{3} = \frac{1}{12}$	$\frac{1}{2} \text{ of } \frac{1}{3} =$	$\frac{1}{2} \text{ of } \frac{1}{6} =$

49. Any one thing is called a **unit**.

50. Any one of the equal parts of a unit is called a **fractional unit**.

Thus, *one half* and *one third* are fractional units.

51. Any number of equal fractional units is called a **fraction**.

Thus, *one half*, *two halves*, *two thirds*, and *seven eighths* are fractions.

52. When a fraction is written in figures, the number below the line is called the **denominator**, and the number above the line the **numerator**. The numerator and the denominator together are called the **terms** of the fraction.

Thus, in the fraction $\frac{4}{5}$, 5 is the denominator, 4 the numerator, and 4 and 5 together are the terms of $\frac{4}{5}$.

53. Exercise:

Read the numerator and the denominator of each of these fractions:

1. $\frac{1}{2}$

2. $\frac{3}{5}$

3. $\frac{4}{4}$

4. $\frac{6}{7}$

5. $\frac{11}{8}$

6. $\frac{7}{7}$

7. $\frac{6}{10}$

8. $\frac{1}{9}$

9. $\frac{4}{2}$

10. $\frac{2}{11}$

11. $\frac{9}{7}$

12. $\frac{12}{12}$

54. Exercise:

Write each of these fractions and tell whether it is less than one, equal to one, or greater than one.

1. Numerator 4, denominator 5.
2. Numerator 6, denominator 6.
3. Numerator 7, denominator 3.
4. Numerator 8, denominator 9.
5. Numerator 11, denominator 12.

55. A fraction whose numerator is less than its denominator is called a **proper fraction**; as, $\frac{4}{5}$.

56. A fraction whose numerator is equal to or greater than its denominator is called an **improper fraction**; as, $\frac{4}{4}$ and $\frac{7}{4}$.

57. A whole number is called an **integer**; as, 7.

58. A number made up of an integer and a fraction is called a **mixed number**; as, $2\frac{3}{4}$.

59. Exercise:

Tell whether each of the following is a proper fraction, an improper fraction, an integer or a mixed number.

1. $\frac{2}{3}$

2. $\frac{5}{6}$

3. $\frac{9}{8}$

4. $\frac{6}{6}$

5. $2\frac{1}{2}$

6. $\frac{2}{2}$

7. 5

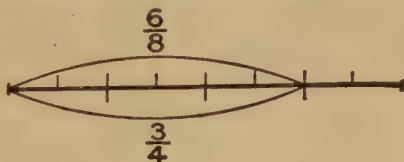
8. $4\frac{3}{4}$

9. 12

10. $\frac{3}{2}$

Reduction

60. Changing the form of a number without changing its value is called **reduction**.

Reducing Fractions to Higher Terms; to Lower Terms**61.**

Here we see that:

$$\frac{3}{4} = \frac{6}{8} = \frac{2 \times 3}{2 \times 4}; \text{ and } \frac{6}{8} = \frac{3}{4} = \frac{6 \div 2}{8 \div 2}.$$

Therefore,

Multiplying or dividing both terms of a fraction by the same number does not change its value.

62. Changing $\frac{3}{4}$ to $\frac{6}{8}$ is *reducing $\frac{3}{4}$ to higher terms*.

63. Changing $\frac{6}{8}$ to $\frac{3}{4}$ is *reducing $\frac{6}{8}$ to lower terms*.

64. Exercise:

Read, supplying the missing numbers:

1. $\frac{1}{2} = \frac{\quad}{4}$

2. $\frac{2}{3} = \frac{\quad}{6}$

3. $\frac{3}{4} = \frac{\quad}{8}$

4. $\frac{4}{3} = \frac{\quad}{9}$

5. $\frac{3}{8} = \frac{3}{40}$ 6. $\frac{2}{3} = \frac{2}{9}$ 7. $\frac{3}{5} = \frac{3}{25}$ 8. $\frac{2}{15} = \frac{2}{30}$
 9. $\frac{6}{8} = \frac{3}{4}$ 10. $\frac{2}{4} = \frac{1}{2}$ 11. $\frac{6}{4} = \frac{3}{2}$ 12. $\frac{10}{15} = \frac{2}{3}$
 13. $\frac{12}{16} = \frac{3}{4}$ 14. $\frac{14}{16} = \frac{7}{8}$ 15. $\frac{15}{20} = \frac{3}{4}$ 16. $\frac{20}{25} = \frac{4}{5}$
 17. $\frac{18}{12} = \frac{3}{2}$ 18. $\frac{12}{10} = \frac{6}{5}$ 19. $\frac{15}{18} = \frac{5}{6}$ 20. $\frac{24}{30} = \frac{4}{5}$

Reducing Fractions to Lowest Terms

65. A fraction is said to be in its **lowest terms** when there is no number, other than one, that will divide its numerator and denominator without a remainder.

Thus, $\frac{3}{4}$ is in its lowest terms, since no number, other than 1, will divide both 3 and 4 without a remainder.

66. Exercise :

Reduce to lowest terms :

1. $\frac{18}{24}$

Thus, $\frac{18}{24} = \frac{9}{12} = \frac{3}{4}$. (Divide both terms of $\frac{18}{24}$ by 2 and of $\frac{9}{12}$ by 3.)

Or better, $\frac{18}{24} = \frac{3}{4}$. (Divide both terms of $\frac{18}{24}$ by 6.)

2. $\frac{4}{8}$ 3. $\frac{6}{12}$ 4. $\frac{5}{10}$ 5. $\frac{6}{8}$ 6. $\frac{6}{9}$
 7. $\frac{8}{10}$ 8. $\frac{8}{12}$ 9. $\frac{8}{16}$ 10. $\frac{9}{12}$ 11. $\frac{8}{24}$
 12. $\frac{10}{24}$ 13. $\frac{12}{24}$ 14. $\frac{18}{24}$ 15. $\frac{16}{24}$ 16. $\frac{20}{24}$

Reducing Integers and Mixed Numbers to Fractions

67. This shows that $2\frac{1}{4} = \frac{9}{4}$.



68. Exercise :

Show that :

1. $2 = \frac{4}{2}$

2. $3 = \frac{9}{3}$

3. $2\frac{1}{2} = \frac{5}{2}$

4. $2\frac{1}{3} = \frac{7}{3}$

5. $3\frac{1}{3} = \frac{10}{3}$

6. $2 = \frac{10}{5}$

7. $3\frac{2}{5} = \frac{17}{5}$

8. $2\frac{2}{5} = \frac{12}{5}$

69. Exercise :

Reduce :

1. 2 to thirds.

Thus, in 1 there are $\frac{3}{3}$, and in 2 there are 2 times $\frac{3}{3}$, or $\frac{6}{3}$.

2. 2 to halves.

3. 4 to halves.

4. 2 to fourths.

5. 4 to thirds.

6. 5 to thirds.

7. 5 to halves.

Reduce to fractions :

8. $2\frac{2}{3}$

Thus, in 1 there are $\frac{3}{3}$ and in 2 there are 2 times $\frac{3}{3}$, or $\frac{6}{3}$, and in $2\frac{2}{3}$ there are $\frac{6}{3}$ plus $\frac{2}{3}$, or $\frac{8}{3}$.

9. $1\frac{1}{2}$

10. $2\frac{1}{3}$

11. $3\frac{1}{2}$

12. $3\frac{2}{3}$

13. $1\frac{2}{3}$

14. $4\frac{1}{2}$

15. $6\frac{2}{3}$

16. $5\frac{1}{2}$

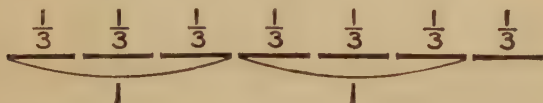
17. $3\frac{1}{3}$

18. $7\frac{1}{2}$

19. $12\frac{1}{2}$

20. $10\frac{2}{3}$

Reducing Improper Fractions to Integers or Mixed Numbers

70. This shows that $\frac{7}{3} = 2\frac{1}{3}$.**71. Exercise :**

Show that :

1. $\frac{2}{2} = 1$

2. $\frac{4}{2} = 2$

3. $\frac{3}{2} = 1\frac{1}{2}$

4. $\frac{5}{2} = 2\frac{1}{2}$

5. $\frac{8}{3} = 2\frac{2}{3}$

6. $\frac{7}{4} = 1\frac{3}{4}$

7. $\frac{7}{2} = 3\frac{1}{2}$

8. $\frac{10}{3} = 3\frac{1}{3}$

72. This shows that $\frac{2}{3} = \frac{1}{3}$ of 2, or $2 \div 3$.



A fraction denotes that the numerator is to be divided by the denominator.

73. Oral Exercise :

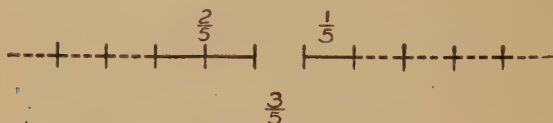
Reduce to a whole or mixed number :

1. $\frac{7}{3}$ Thus, $\frac{7}{3}$ equals $\frac{1}{3}$ of 7, or $2\frac{1}{3}$.
 2. $\frac{8}{2}$ 3. $\frac{9}{3}$ 4. $\frac{9}{4}$ 5. $\frac{18}{5}$ 6. $\frac{14}{4}$ 7. $\frac{20}{6}$
 8. $\frac{25}{6}$ 9. $\frac{15}{4}$ 10. $\frac{32}{5}$ 11. $\frac{17}{3}$ 12. $\frac{21}{4}$ 13. $\frac{40}{9}$

Addition and Subtraction

74. Here we see that $\frac{2}{5} + \frac{1}{5} = \frac{3}{5}$.

Also that $\frac{2}{5} - \frac{1}{5} = \frac{1}{5}$.



To add fractions that have the same denominator (*a common denominator*), add their numerators and place the result over their common denominator.

To subtract two fractions that have the same denominator, subtract their numerators and place the result over their common denominator.

75. Exercise :

Add at sight :

1. $\frac{1}{2} + \frac{1}{2}$

Thus, $\frac{1}{2} + \frac{1}{2} = \frac{2}{2}$, or 1 ($\frac{2}{2}$ reduced to an integer).

2. $\frac{2}{5} + \frac{4}{5}$

Thus, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5}$, or $1\frac{1}{5}$ ($\frac{6}{5}$ reduced to a mixed number).

3. $\frac{1}{4} + \frac{1}{4}$

Thus, $\frac{1}{4} + \frac{1}{4} = \frac{2}{4}$, or $\frac{1}{2}$ ($\frac{2}{4}$ reduced to lowest terms).

4. $\frac{1}{3} + \frac{2}{3}$

5. $\frac{1}{5} + \frac{3}{5}$

6. $\frac{1}{2} + \frac{2}{2}$

7. $\frac{1}{8} + \frac{5}{8}$

8. $\frac{1}{6} + \frac{2}{6}$

9. $\frac{1}{9} + \frac{2}{9}$

10. $\frac{1}{4} + \frac{3}{4}$

11. $\frac{1}{8} + \frac{5}{8}$

12. $\frac{2}{3} + \frac{2}{3}$

13. $\frac{3}{4} + \frac{2}{4}$

14. $\frac{3}{8} + \frac{7}{8}$

15. $\frac{5}{6} + \frac{3}{6}$

16. $\frac{3}{4} + \frac{5}{4}$

17. $\frac{1}{12} + \frac{5}{12}$

18. $\frac{3}{12} + \frac{7}{12}$

19. $\frac{4}{5} + \frac{2}{5}$

20. $\frac{3}{10} + \frac{7}{10}$

21. $\frac{3}{10} + \frac{9}{10}$

76. Exercise :

Subtract at sight the smaller fraction from the larger in each example of Section 75.

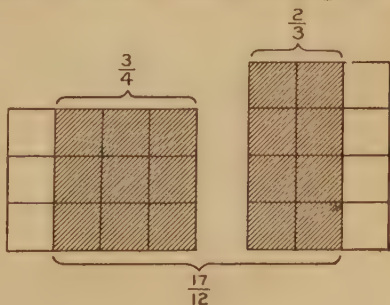
77. Add $\frac{3}{4}$ and $\frac{2}{3}$.

Here we see that :

$$\frac{3}{4} = \frac{9}{12}$$

$$\frac{2}{3} = \frac{8}{12}$$

$$\text{Sum} = \frac{17}{12}, \text{ or } 1\frac{5}{12}$$



To add fractions that do not have a common denominator change them to fractions having a common denominator, add the numerators, and place the result over their common denominator.

78. Notice in Section 77 that 12 is the least number that the denominators of $\frac{3}{4}$ and $\frac{2}{3}$ will each divide without a remainder; it is the **least common denominator** (l. c. d.) of $\frac{3}{4}$ and $\frac{2}{3}$.

79. **Exercise:**

State what is the least common denominator in each example and add:

- | | | |
|----------------------------------|----------------------------------|----------------------------------|
| 1. $\frac{1}{2} + \frac{1}{4}$ | 2. $\frac{1}{2} + \frac{3}{4}$ | 3. $\frac{1}{2} + \frac{1}{8}$ |
| 4. $\frac{1}{2} + \frac{3}{8}$ | 5. $\frac{3}{4} + \frac{1}{8}$ | 6. $\frac{1}{3} + \frac{1}{2}$ |
| 7. $\frac{3}{4} + \frac{3}{8}$ | 8. $\frac{2}{3} + \frac{5}{6}$ | 9. $\frac{2}{3} + \frac{5}{9}$ |
| 10. $\frac{3}{4} + \frac{5}{8}$ | 11. $\frac{2}{3} + \frac{4}{5}$ | 12. $\frac{3}{4} + \frac{4}{5}$ |
| 13. $\frac{2}{3} + \frac{7}{9}$ | 14. $\frac{1}{3} + \frac{5}{9}$ | 15. $\frac{3}{4} + \frac{5}{6}$ |
| 16. $\frac{2}{3} + \frac{5}{12}$ | 17. $\frac{3}{4} + \frac{7}{12}$ | 18. $\frac{5}{6} + \frac{7}{12}$ |

80. Subtract $\frac{2}{3}$ from $\frac{3}{4}$.

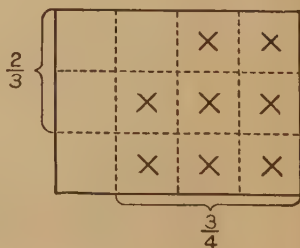
Here we see that:

$$\begin{array}{r} \frac{3}{4} = \frac{9}{12} \\ \frac{2}{3} = \frac{8}{12} \\ \hline \text{Difference} = \frac{1}{12} \end{array}$$

How many 12ths are there in $\frac{3}{4}$?

How many 12ths are crossed off in

$\frac{3}{4}$?



To subtract fractions that do not have a common denominator, change them to fractions having a common denominator, subtract the numerators, and place the result over their common denominator.

81. Exercise :

State what is the least common denominator in each example and subtract :

- | | | | | |
|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| 1. $\frac{1}{2} - \frac{1}{4}$ | 2. $\frac{3}{4} - \frac{1}{8}$ | 3. $\frac{3}{8} - \frac{1}{4}$ | 4. $\frac{1}{2} - \frac{1}{8}$ | 5. $\frac{5}{8} - \frac{1}{4}$ |
| 6. $\frac{7}{8} - \frac{1}{2}$ | 7. $\frac{3}{4} - \frac{1}{2}$ | 8. $\frac{1}{2} - \frac{3}{8}$ | 9. $\frac{3}{4} - \frac{3}{8}$ | 10. $\frac{5}{6} - \frac{2}{3}$ |
| 11. $\frac{2}{3} - \frac{1}{6}$ | 12. $\frac{3}{4} - \frac{1}{6}$ | 13. $\frac{5}{6} - \frac{1}{4}$ | 14. $\frac{7}{8} - \frac{1}{4}$ | 15. $\frac{7}{8} - \frac{3}{4}$ |

82. Find the sum of $12\frac{1}{2}$, $16\frac{2}{3}$, and $20\frac{3}{4}$.

$$\begin{aligned}
 12\frac{1}{2} &= 12\frac{6}{12} \\
 16\frac{2}{3} &= 16\frac{8}{12} \\
 20\frac{3}{4} &= 20\frac{9}{12} \\
 \text{Sum} &= 48\frac{23}{12}, \text{ or } 49\frac{11}{12}.
 \end{aligned}$$

83. Exercise :

Add :

- | | | |
|---|--|--|
| 1. $12\frac{1}{2}$
$6\frac{1}{4}$
<u>$18\frac{3}{4}$</u> | 2. $33\frac{1}{3}$
$16\frac{2}{3}$
<u>$22\frac{2}{9}$</u> | 3. $16\frac{1}{6}$
$66\frac{2}{3}$
<u>$37\frac{1}{2}$</u> |
|---|--|--|
-
- | | |
|---|---|
| 4. $12\frac{1}{2}$ and $50\frac{1}{2}$. | 5. $33\frac{1}{3}$ and $66\frac{2}{3}$. |
| 6. $45\frac{1}{2}$ and $25\frac{1}{4}$. | 7. $18\frac{3}{4}$ and $16\frac{1}{2}$. |
| 8. $28\frac{3}{4}$ and $16\frac{2}{3}$. | 9. $85\frac{2}{3}$ and $17\frac{4}{5}$. |
| 10. $18\frac{3}{4}$, $32\frac{3}{4}$, and $12\frac{3}{4}$. | 11. $16\frac{2}{3}$, $33\frac{1}{3}$, and $66\frac{2}{3}$. |
| 12. $6\frac{1}{6}$, $33\frac{1}{3}$, and $66\frac{2}{3}$. | 13. $12\frac{1}{2}$, $16\frac{3}{4}$, and $18\frac{3}{4}$. |

84. Find the difference between $18\frac{2}{3}$ and $11\frac{3}{4}$.

$18\frac{2}{3} = 18\frac{8}{12}, \text{ or } 17\frac{20}{12}$	SUGGESTION. $\frac{9}{12}$ cannot be
$11\frac{3}{4} = 11\frac{9}{12}$	taken from $\frac{8}{12}$; hence, reduce 1
Difference = $6\frac{11}{12}$	of the 18 to $\frac{12}{12}$ and add $\frac{12}{12}$ to $\frac{8}{12}$.

85. Exercise:

Find the difference between :

- | | |
|---|---|
| 1. 25 and $61\frac{1}{4}$. | 2. 100 and $37\frac{1}{2}$. |
| 3. $87\frac{1}{2}$ and $62\frac{1}{2}$. | 4. $66\frac{2}{3}$ and $33\frac{1}{3}$. |
| 5. $87\frac{1}{2}$ and $18\frac{3}{4}$. | 6. 100 and $44\frac{4}{9}$. |
| 7. $70\frac{2}{5}$ and $25\frac{3}{10}$. | 8. $42\frac{6}{7}$ and $14\frac{2}{7}$. |
| 9. $75\frac{1}{7}$ and $28\frac{3}{14}$. | 10. $90\frac{2}{9}$ and $25\frac{2}{3}$. |

86. Exercise:

1. If $\frac{1}{2}$ of a pound of green tea is mixed with $\frac{1}{4}$ of a pound of black tea, what is the weight of the mixture?
2. A farmer bought $\frac{3}{4}$ of a bushel of grass seed and sowed $\frac{3}{8}$ of a bushel; how much remained?
3. After a man has drawn 20 gal. from a barrel of vinegar which contained $31\frac{1}{2}$ gal., how much remains?
4. After 2 pieces, one $8\frac{3}{4}$ ft. long and the other $12\frac{1}{2}$ ft. long, had been cut from a 30-foot log, what length remained?
5. A market woman received $\$1\frac{3}{4}$ for butter, $\$2\frac{3}{4}$ for eggs, $\$4\frac{1}{2}$ for vegetables, and $\$3\frac{3}{4}$ for fruit; how much did her produce amount to?

6. $37\frac{1}{2}$ yards of bunting were sold from a piece containing 50 yards; how much remained?

7. To make a mixed tea a merchant used $12\frac{3}{4}$ pounds of green tea and $18\frac{7}{8}$ pounds of black tea; how many pounds were there in the mixture?

8. The sum of two numbers is 100; if one of them is $18\frac{3}{4}$, what is the other?

9. How much change should a customer receive from a \$10 bill if he buys groceries to the amount of \$ $5\frac{3}{4}$ and dry goods to the amount of \$ $3\frac{3}{5}$?

10. A telegraph pole 40 feet long was set $4\frac{3}{4}$ feet in the ground; how many feet of it were above ground?

11. A girl received a mark of $80\frac{1}{2}$ in arithmetic and $86\frac{1}{2}$ in geography; what was her average in the two studies?

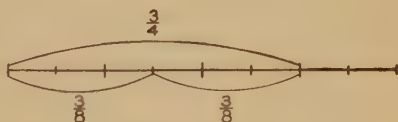
Multiplying Fractions and Mixed Numbers by Whole Numbers

87. Multiply $\frac{3}{8}$ by 2.

Here we see that:

$$2 \times \frac{3}{8} = \frac{6}{8} = \frac{2 \times 3}{8};$$

$$\text{also, } 2 \times \frac{3}{8} = \frac{3}{4} = \frac{3}{8 \div 2}.$$



Therefore,

To multiply a fraction by a whole number, multiply the numerator or divide the denominator by the whole number.

NOTE. Divide the denominator when possible.

88. Exercise:

Make drawings to show that:

1. $2 \times \frac{2}{5} = \frac{4}{5}$

2. $2 \times \frac{2}{7} = \frac{4}{7}$

3. $2 \times \frac{3}{5} = \frac{6}{5}$, or $1\frac{1}{5}$

4. $2 \times \frac{5}{12} = \frac{5}{6}$

5. $3 \times \frac{2}{9} = \frac{2}{3}$

6. $2 \times \frac{5}{8} = \frac{5}{4}$, or $1\frac{1}{4}$

Supply the missing numbers at sight:

7. $2 \times \frac{1}{3} =$

8. $3 \times \frac{2}{7} =$

9. $2 \times \frac{2}{9} =$

10. $2 \times \frac{5}{12} =$

11. $3 \times \frac{2}{9} =$

12. $2 \times \frac{3}{10} =$

13. $3 \times \frac{3}{5} =$

14. $2 \times \frac{8}{5} =$

15. $4 \times \frac{2}{3} =$

16. $3 \times \frac{5}{6} =$

17. $5 \times \frac{3}{10} =$

18. $4 \times \frac{3}{4} =$

19. $2 \times 2\frac{1}{3} =$

SUGGESTION. Multiply both the fraction and the whole number.

20. $2 \times 1\frac{1}{6} =$

21. $3 \times 2\frac{2}{9} =$

22. $5 \times 3\frac{3}{5} =$

23. $3 \times 3\frac{1}{3} =$

24. $4 \times 2\frac{1}{2} =$

25. $4 \times 3\frac{1}{3} =$

89. Multiply $66\frac{2}{3}$ by 8.

This shows the complete work:

$$\begin{array}{r} 66\frac{2}{3} \\ \times 8 \\ \hline 528 \\ 53\frac{1}{3} = 8 \times \frac{2}{3} \\ \hline 533\frac{1}{3} = 8 \times 66\frac{2}{3} \end{array}$$

In practice write only this:

$$\begin{array}{r} 66\frac{2}{3} \\ \times 8 \\ \hline 528 \\ 53\frac{1}{3} \\ \hline 533\frac{1}{3} \end{array}$$

90. Exercise:

Copy and multiply:

1. $16\frac{2}{3}$
6

2. $33\frac{1}{3}$
3

3. $12\frac{1}{2}$
8

4. $37\frac{1}{2}$
8

$$\begin{array}{r} 5. \quad 62\frac{1}{2} \\ \quad \quad 4 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 87\frac{1}{2} \\ \quad \quad 8 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 66\frac{2}{3} \\ \quad \quad 3 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 18\frac{3}{4} \\ \quad \quad 4 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 56\frac{2}{3} \\ \quad \quad 2 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 75\frac{1}{2} \\ \quad \quad 3 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 80\frac{3}{4} \\ \quad \quad 5 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 46\frac{2}{3} \\ \quad \quad 8 \\ \hline \end{array}$$

91. Exercise:

Find the cost of:

1. 10 pounds of twine at $6\frac{1}{2}$ cents a pound.
2. 6 pounds of meat at $12\frac{1}{2}$ cents a pound.
3. 3 bushels of grass seed at $\$2\frac{3}{4}$ a bushel.
4. 12 towels at $6\frac{1}{2}$ cents each.
5. 3 boys' suits at $\$3\frac{1}{4}$ each.
6. 10 yards of dress goods at $\$1\frac{1}{2}$ a yard.
7. 6 bedspreads at $\$1\frac{1}{4}$ each.
8. 4 pairs of lace curtains at $\$4\frac{3}{4}$ a pair.
9. 2 square yards of linoleum at $42\frac{1}{2}$ cents a square yard.
10. 5 pairs of shoes at $\$3\frac{1}{4}$ a pair.

Multiplying Whole Numbers by Fractions and by Mixed Numbers

92. Exercise:

Answer at sight:

1. $\frac{1}{2}$ of 3? 2. $\frac{1}{2}$ of 5? 3. $\frac{1}{2}$ of 7? 4. $\frac{1}{3}$ of 5?
5. $\frac{1}{3}$ of 7? 6. $\frac{1}{3}$ of 8? 7. $\frac{1}{4}$ of 2? 8. $\frac{1}{4}$ of 3?
9. $\frac{1}{4}$ of 5? 10. $\frac{1}{4}$ of 6? 11. $\frac{1}{4}$ of 7? 12. $\frac{1}{4}$ of 11?
13. $\frac{1}{3}$ of 10? 14. $\frac{1}{6}$ of 15? 15. $\frac{1}{8}$ of 50? 16. $\frac{1}{10}$ of 75?

93. What is $\frac{2}{3}$ of 4?

$\frac{1}{3}$ of 4 is $\frac{4}{3}$, and $\frac{2}{3}$ of 4 is 2 times $\frac{4}{3}$, or $\frac{8}{3}$, or $2\frac{2}{3}$.

NOTE. $\frac{2}{3}$ of 4 and $\frac{2}{3} \times 4$ have the same meaning.

94. Exercise:

Answer at sight:

- | | | |
|--------------------------|--------------------------|-------------------------|
| 1. $\frac{2}{3}$ of 5? | 2. $\frac{3}{4}$ of 4? | 3. $\frac{3}{4}$ of 5? |
| 4. $\frac{2}{5}$ of 7? | 5. $\frac{2}{3}$ of 8? | 6. $\frac{3}{4}$ of 6? |
| 7. $\frac{3}{4}$ of 9? | 8. $\frac{3}{4}$ of 7? | 9. $\frac{4}{5}$ of 8? |
| 10. $\frac{3}{4}$ of 10? | 11. $\frac{4}{5}$ of 12? | 12. $\frac{5}{6}$ of 9? |

95. Multiply 25 by $8\frac{2}{3}$.

This shows the complete work:

$$\begin{array}{r}
 25 \\
 \underline{8\frac{2}{3}} \\
 200 = 8 \times 25 \\
 \underline{16\frac{2}{3} = \frac{2}{3} \text{ of } 25} \\
 216\frac{2}{3} = 8\frac{2}{3} \times 25
 \end{array}$$

In practice write only this:

$$\begin{array}{r}
 25 \\
 \underline{8\frac{2}{3}} \\
 200 \\
 \underline{16\frac{2}{3}} \\
 216\frac{2}{3}
 \end{array}$$

96. Exercise:

Copy and multiply:

- | | | | |
|--------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|
| 1. 12
$\underline{6\frac{1}{3}}$ | 2. 15
$\underline{8\frac{2}{3}}$ | 3. 16
$\underline{5\frac{3}{4}}$ | 4. 24
$\underline{6\frac{2}{3}}$ |
| 5. 25
$\underline{5\frac{3}{5}}$ | 6. 32
$\underline{8\frac{3}{8}}$ | 7. 56
$\underline{9\frac{3}{8}}$ | 8. 35
$\underline{10\frac{2}{5}}$ |
| 9. 30
$\underline{10\frac{3}{5}}$ | 10. 25
$\underline{8\frac{1}{3}}$ | 11. 38
$\underline{7\frac{1}{4}}$ | 12. 75
$\underline{7\frac{1}{2}}$ |
| 13. 50
$\underline{6\frac{2}{3}}$ | 14. 35
$\underline{8\frac{2}{3}}$ | 15. 84
$\underline{3\frac{3}{5}}$ | 16. 100
$\underline{7\frac{3}{8}}$ |

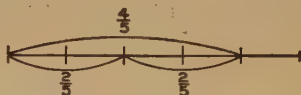
97. Exercise:

Find the cost of:

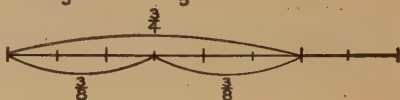
1. $1\frac{1}{2}$ pounds of butter at 24 cents a pound.
2. $2\frac{1}{2}$ yards of cloth at 12 cents a yard.
3. $3\frac{1}{4}$ pounds of ham at 16 cents a pound.
4. $4\frac{1}{2}$ dozen eggs at 24 cents a dozen.
5. $2\frac{1}{2}$ tons of coal at \$ 6 a ton.
6. $1\frac{1}{2}$ bushels of clover seed at \$ 11 a bushel.
7. $4\frac{1}{2}$ bushels of oats at \$ 0.50 a bushel.
8. $2\frac{3}{4}$ bushels of potatoes at \$ 1.20 a bushel.
9. $2\frac{3}{4}$ acres of land at \$ 100 an acre.
10. $6\frac{3}{4}$ pounds of poultry at 14 cents a pound.
11. $5\frac{1}{2}$ pounds of beef at 18 cents a pound.
12. $3\frac{1}{2}$ tons of hay at \$ 20 a ton.
13. $7\frac{1}{4}$ pounds of lard at 12 cents a pound.
14. $1\frac{7}{8}$ pounds of cheese at 16 cents a pound.
15. $18\frac{3}{4}$ yards of carpet at \$ 1.20 a yard.
16. $1\frac{1}{2}$ dozen oranges at 18 cents a dozen.
17. $7\frac{1}{2}$ yards of toweling at 10 cents a yard.
18. $2\frac{3}{4}$ pounds of honey at 32 cents a pound.
19. $7\frac{1}{2}$ gallons of gasoline at 24 cents a gallon.
20. $8\frac{1}{2}$ yards of gingham at 12 cents a yard.
21. $2\frac{1}{2}$ dozen bananas at 16 cents a dozen.
22. $3\frac{3}{4}$ yards of flannel at 24 cents a yard.
23. $3\frac{1}{4}$ gallons of vinegar at 40 cents a gallon.

Dividing Fractions and Mixed Numbers by Whole Numbers

98. 1. $\frac{4}{5} \div 2 = \frac{2}{5}$, or $\frac{4 \div 2}{5}$.



2. $\frac{3}{4} \div 2 = \frac{3}{8}$, or $\frac{3}{2 \times 4}$.



To divide a fraction by a whole number, divide the numerator or multiply the denominator by the whole number.

NOTE. Divide the numerator when possible.

99. Exercise:

Make drawings to show that:

1. $\frac{2}{3} \div 2 = \frac{1}{3}$

2. $\frac{2}{7} \div 2 = \frac{1}{7}$

3. $\frac{6}{7} \div 2 = \frac{3}{7}$

4. $\frac{2}{3} \div 3 = \frac{2}{9}$

5. $\frac{1}{5} \div 2 = \frac{1}{10}$

6. $\frac{3}{5} \div 2 = \frac{3}{10}$

Supply the missing numbers at sight:

7. $\frac{4}{5} \div 2 =$

8. $\frac{6}{7} \div 3 =$

9. $\frac{4}{5} \div 2 =$

10. $\frac{2}{5} \div 3 =$

11. $\frac{5}{8} \div 2 =$

12. $\frac{6}{5} \div 2 =$

13. $\frac{10}{3} \div 5 =$

14. $\frac{1}{2} \div 5 =$

15. $\frac{4}{5} \div 5 =$

16. $2\frac{2}{3} \div 2 =$

SUGGESTION: Divide the whole number and then the fraction.

17. $12\frac{6}{7} \div 3 =$

18. $8\frac{8}{9} \div 4 =$

19. $10\frac{5}{6} \div 5 =$

20. $12\frac{7}{9} \div 6 =$

21. $15\frac{3}{5} \div 5 =$

22. $18\frac{3}{4} \div 3 =$

23. $16\frac{1}{2} \div 2 =$

24. $12\frac{1}{2} \div 4 =$

25. $18\frac{3}{4} \div 2 =$

REVIEW OF FRACTIONS

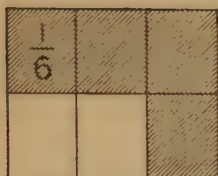


Fig. 1.

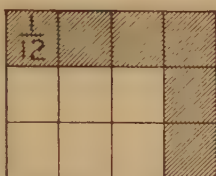


Fig. 2.

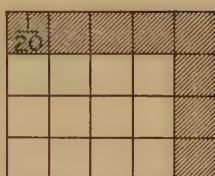


Fig. 3.

100. Exercise:

Read, supplying the missing numbers:

(Refer to Fig. 1)

1. $\frac{1}{2} = \frac{\quad}{6}$

2. $\frac{3}{3} = \frac{\quad}{6}$

3. $\frac{1}{2} - \frac{1}{3} = \frac{\quad}{6}$

4. $\frac{5}{6} - \frac{1}{3} = \frac{\quad}{6}$

5. $1 - \frac{2}{3} = \frac{\quad}{3}$

6. $\frac{2}{3} = \frac{\quad}{12}$

7. $\frac{1}{3} - \frac{1}{4} = \frac{\quad}{12}$

8. $\frac{2}{3} + \frac{3}{4} = \frac{\quad}{12}$

9. $1 - \frac{1}{12} = \frac{\quad}{12}$

10. $\frac{1}{5} = \frac{\quad}{20}$

11. $\frac{4}{5} = \frac{\quad}{20}$

12. $\frac{2}{5} + \frac{3}{4} = \frac{\quad}{20}$

13. $\frac{3}{4} - \frac{3}{5} = \frac{\quad}{20}$

(Refer to Fig. 2)

14. $\frac{1}{3} = \frac{\quad}{6}$

15. $\frac{2}{3} = \frac{\quad}{6}$

16. $\frac{1}{2} + \frac{2}{3} = \frac{\quad}{6}$

17. $1 - \frac{1}{2} = \frac{\quad}{2}$

18. $\frac{1}{3} = \frac{\quad}{12}$

19. $\frac{3}{4} = \frac{\quad}{12}$

20. $\frac{2}{3} + \frac{1}{4} = \frac{\quad}{12}$

21. $\frac{2}{3} - \frac{1}{4} = \frac{\quad}{12}$

22. $1 - \frac{7}{12} = \frac{\quad}{12}$

23. $\frac{3}{4} = \frac{\quad}{20}$

24. $\frac{1}{5} + \frac{1}{4} = \frac{\quad}{20}$

25. $1 - \frac{1}{5} = \frac{\quad}{5}$

26. $\frac{3}{5} - \frac{1}{4} = \frac{\quad}{20}$

(Refer to Fig. 3)

27. $\frac{2}{2} = \frac{\quad}{6}$

28. $\frac{1}{2} + \frac{1}{3} = \frac{\quad}{6}$

29. $\frac{2}{3} - \frac{1}{2} = \frac{\quad}{6}$

30. $1 - \frac{1}{3} = \frac{\quad}{3}$

31. $\frac{1}{4} = \frac{\quad}{12}$

32. $\frac{1}{3} + \frac{1}{4} = \frac{\quad}{12}$

33. $\frac{3}{4} + \frac{1}{3} = \frac{\quad}{12}$

34. $\frac{3}{4} - \frac{2}{3} = \frac{\quad}{12}$

35. $\frac{1}{4} = \frac{\quad}{20}$

36. $\frac{3}{5} = \frac{\quad}{20}$

37. $\frac{1}{5} + \frac{3}{4} = \frac{\quad}{20}$

38. $\frac{1}{4} - \frac{1}{5} = \frac{\quad}{20}$

39. $\frac{3}{4} - \frac{2}{5} = \frac{\quad}{20}$

40. Name at sight the whole or mixed number equal to :

$$\frac{10}{3}; \frac{4}{4}; \frac{7}{2}; \frac{15}{4}; \frac{10}{10}; \frac{25}{3}; \frac{11}{5}.$$

41. What should $\frac{3}{4}$ of a yard of silk cost at \$4 per yard?

42. What will $\frac{3}{4}$ of a pound of dried beef cost at 24¢ per pound?

43. $\frac{3}{4}$ of a gallon of sirup will fill how many bottles, each holding $\frac{1}{8}$ of a gallon?

44. A \$5 bill is worth how many quarter dollars?

45. Four $2\frac{1}{2}$ -dollar gold pieces are worth how many half dollars?

46. $\frac{7}{10}$ of a dollar is equal to how many dimes? how many cents?

47. 24 quarter dollars are worth how many dollars? how many half dollars?

48. 15 quarter dollars are worth how many dollars? how many half dollars?

49. If $\frac{3}{4}$ yd. of velvet cost \$ $\frac{3}{4}$, how much does a yard cost?

50. $\frac{1}{8}$ of a bushel plus $\frac{1}{4}$ of a bushel are how many eighths of a bushel? how many pecks?

51. A lady who charges \$ $1\frac{1}{2}$ a day for board, at the same rate charges how much for a week's board?

52. When matches are selling at 2 boxes for 5¢, how much is that a box?

53. How many bushels of corn are there in 3 barrels, each containing $2\frac{1}{2}$ bushels?

54. A woman had a dozen and a half of eggs and used 9 of them; how many had she left?

55. A milkman put $\frac{3}{4}$ of a gallon of cream into pint jars; how many pint jars did he need?

56. When lemons are selling at 3 for 10 ¢, how much is that a dozen?

57. 4 pounds of spices were put up in 8 packages of equal size; what part of a pound did each contain?

58. If 4 pounds of coffee cost \$ 1, what part of a dollar will 1 pound cost? how many cents?

59. How many yards of ribbon are needed to make 10 badges, if each badge requires $\frac{1}{4}$ of a yard?

60. What should a boy receive for 8 pounds of old iron at $\frac{3}{4}$ of a cent a pound?

61. A merchant put up 10 pounds of candy in half-pound boxes; how many boxes did he use?

62. What does a newsboy gain on 10 papers bought at $\frac{1}{2}$ a cent each and sold at 1 cent each?

63. What is the cost of $2\frac{1}{2}$ pounds of sugar at 6 ¢ a pound?

64. A man bought a pair of shoes for $\$2\frac{1}{4}$ and a hat for $\$2\frac{1}{2}$ and gave in payment a \$10 bill; how much change should he receive?

DECIMALS

Tenths

101. Tenths may be written with figures in two ways ; either in :

Fractional Form or Decimal Form

$$\frac{1}{10} = .1$$

$$\frac{2}{10} = .2$$

$$\frac{3}{10} = .3$$

$$\frac{10}{10} = 1.0$$

(Usually read **one**, but may be read **ten tenths**.)

$$\frac{11}{10} = 1.1$$

(Usually read **one and one tenth**, but may be read **eleven tenths**.)

Notice that :

In writing tenths, the decimal form is the numerator of the fractional form and so written that there is one figure to the right of the decimal point.

102. Fractional forms are called **common fractions** and decimal forms are called **decimals**.

103. Exercise :

Write as decimals :

1. $\frac{4}{10}$

2. $\frac{6}{10}$

3. $\frac{5}{10}$

4. $\frac{8}{10}$

5. $\frac{12}{10}$

6. $\frac{15}{10}$

7. $\frac{18}{10}$

8. $\frac{20}{10}$

9. 7 tenths 10. 9 tenths 11. 13 tenths 12. 15 tenths

Read, and write as common fractions:

13. .1	14. .5	15. .7	16. .9
17. .8	18. 1.2	19. 1.5	20. 1.6

Write in two ways:

21. 1 tenth	22. 8 tenths	23. 5 tenths	24. 3 tenths
25. 6 tenths	26. 2 tenths	27. 4 tenths	28. 10 tenths

Hundredths

104. Hundredths may be written with figures in **two** ways; either as:

Common Fractions or Decimals

$\frac{1}{100}$	=	.01 (one hundredth)
$\frac{2}{100}$	=	.02 (two hundredths)
$\frac{10}{100}$	=	.10
$\frac{100}{100}$	=	1.00
$\frac{125}{100}$	=	1.25 (one and twenty-five hundredths)

Notice that:

In writing hundredths, the decimal is the numerator of the corresponding common fraction and so written that there are two figures to the right of the decimal point.

105. Exercise:

Write as decimals:

1. $\frac{4}{100}$	2. $\frac{5}{100}$	3. $\frac{8}{100}$	4. $\frac{11}{100}$	5. $\frac{20}{100}$
6. $\frac{25}{100}$	7. $\frac{50}{100}$	8. $\frac{75}{100}$	9. $\frac{100}{100}$	10. $\frac{125}{100}$

$$11. \frac{275}{100} \quad 12. \frac{300}{100} \quad 13. \frac{450}{100} \quad 14. \frac{475}{100} \quad 15. \frac{550}{100}$$

16. 7 hundredths

17. 12 hundredths

18. 24 hundredths

19. 80 hundredths

Read, and write as common fractions :

$$20. .04 \quad 21. .05 \quad 22. .06 \quad 23. .09 \quad 24. .12$$

$$25. .30 \quad 26. .45 \quad 27. .50 \quad 28. .75 \quad 29. 1.00$$

$$30. 1.50 \quad 31. 1.75 \quad 32. 2.00 \quad 33. 2.75 \quad 34. 3.50$$

Write in two ways :

35. 9 hundredths

36. 36 hundredths

37. 27 hundredths

38. 51 hundredths

39. 73 hundredths

40. 10 hundredths

41. 44 hundredths

42. 69 hundredths

43. 11 hundredths

44. 82 hundredths

45. 95 hundredths

46. 73 hundredths

Reduction

106. Reduce $\frac{1}{5}$ to tenths and write as a decimal;
also $\frac{24}{30}$.

$$\frac{1}{5} = \frac{2}{10} = .2$$

$$\frac{24}{30} = \frac{8}{10} = .8$$

107. Exercise:

Reduce to tenths and write the results as decimals :

1. $\frac{1}{2}$

2. $\frac{2}{5}$

3. $\frac{4}{5}$

4. $\frac{3}{5}$

5. $\frac{2}{2}$

6. $\frac{5}{5}$

7. $\frac{8}{20}$

8. $\frac{6}{20}$

9. $\frac{12}{20}$

10. $\frac{18}{20}$

11. $\frac{6}{30}$

12. $\frac{9}{30}$

13. $\frac{15}{30}$

14. $\frac{21}{30}$

15. $\frac{24}{30}$

108. Reduce .8 to a common fraction; also 2.75 to a mixed number.

$$.8 = \frac{8}{10} = \frac{4}{5}$$

$$2.75 = 2\frac{75}{100} = 2\frac{3}{4}$$

109. Exercise:

Reduce to common fractions or mixed numbers:

1. .1	2. .3	3. .7	4. .9	5. .2
6. .4	7. .5	8. .6	9. .25	10. .30
11. .40	12. .50	13. .60	14. .75	15. .80
16. 2.1	17. 3.5	18. 5.6	19. 8.7	20. 9.8
21. 4.20	22. 6.35	23. 8.40	24. 9.50	25. 9.75

Addition and Subtraction

110. Find the sum of 3.5, 35.8, 25.35, and 24.76.

3.5	Write the numbers so that units stand in the same column, tenths in the same column, and hundredths in the same column; add as in addition of whole numbers and place the decimal point between units and tenths in the sum.
35.8	
25.35	
24.76	
<u>89.41</u>	

111. Exercise:

Find the sum of:

1.	2.	3.
34.2	47.86	477.96
128.7	165.64	76.4
<u>46.5</u>	<u>8.15</u>	<u>548.07</u>

4.	5.	6.
18.2	1.06	.25
.09	325.8	587.04
112	72.58	2.5
<u>24.75</u>	<u>3.87</u>	<u>74.69</u>

7. .2, .02, .03.

8. .47, .25, .18, .1.

9. .6, .84, .07, .02, .5, .68.

10. 7 tenths, 5 hundredths, 86 hundredths, 3 tenths.

11. 96 hundredths, 47 hundredths, 56 hundredths, 2 tenths.

12. 23 hundredths, 4 tenths, 62 hundredths, 11 hundredths.

112. Subtract:

1. 3.25 from 10.75

$$\begin{array}{r} 10.75 \\ 3.25 \\ \hline 7.50 \end{array}$$

2. 8.25 from 16.5

$$\begin{array}{r} 16.5 \\ 8.25 \\ \hline 8.25 \end{array}$$

Write the numbers so that units stand under units, tenths under tenths, and so on; subtract as in whole numbers and place the decimal point between units and tenths in the difference.

113. Exercise:

Subtract:

1. $\begin{array}{r} 7.56 \\ 3.28 \\ \hline \end{array}$

2. $\begin{array}{r} 37.5 \\ 12.75 \\ \hline \end{array}$

3. $\begin{array}{r} 25.6 \\ 7.86 \\ \hline \end{array}$

4. $\begin{array}{r} 36.00 \\ 12.85 \\ \hline \end{array}$

5. $\begin{array}{r} .8 \\ .37 \\ \hline \end{array}$

6. $\begin{array}{r} 3.00 \\ 1.75 \\ \hline \end{array}$

7. $\begin{array}{r} 2.00 \\ 1.48 \\ \hline \end{array}$

8. $\begin{array}{r} 1.75 \\ .89 \\ \hline \end{array}$

9. 7	10. 48.65	11. 85.3	12. 25
<u>3.25</u>	<u>3.90</u>	<u>18.78</u>	<u>12.75</u>

United States Money

114. The coins of the United States now being made are :

Gold	Silver	Nickel	Bronze
double eagle	dollar	five cents	one cent
eagle	half dollar		
half eagle	quarter dollar		
quarter eagle	dime		

115. Table

10 cents (¢)	= 1 dime (d.)
10 dimes	= 1 dollar (\$)
100 cents	= 1 dollar
10 dollars	= 1 eagle

116. Exercise :

1. What is the name of the place at which our coins are made?
2. Name our gold coins.
3. A double eagle is worth how many dollars? a half eagle? a quarter eagle?
4. Name our silver coins and tell how many cents each is worth.
5. Which of our coins has the least value?
6. Which of our coins are each worth less than a dime?

7. A full set of our gold coins is worth how much?
8. A full set of our silver coins is worth how much?
9. A full set of our coins is worth how much?

Read Examples 10-15, supplying the missing numbers:

10. 3 d. = ——— ¢; 5 d. = ——— ¢; 7 d. = ——— ¢.

11. 40 ¢ = ——— d.; 70 ¢ = ——— d.; 90 ¢ = ——— d.

12. $\$ \frac{1}{2}$ = ——— ¢; $\$ \frac{1}{4}$ = ——— ¢; $\$ \frac{3}{4}$ = ——— ¢.

13. 100 ¢ = \$——; 300 ¢ = \$——; 500 ¢ = \$——.

14. A half dollar is worth ——— dimes.

15. A quarter dollar is worth ——— nickels.

16. Tell for what part of a dollar each of these figures stands:

$\$ 0.11$

$\$ 0.22$

$\$ 0.55$

For how many dimes does the first 1 stand? the first 2? the first 5?

For how many cents does the second 1 stand? the second 2? the second 5?

Notice that dimes are written in tenths' place and cents in hundredths' place.

Complete:

17. $\$ 6.37 = \$ 6 + 3 \text{ d.} + 7 \text{ ¢.}$

18. $\$ 5.87 = \$ \text{——} + \text{—— d.} + \text{—— ¢.}$

19. $\$ 8.95 = \$ \text{——} + \text{—— d.} + \text{—— ¢.}$

20. $\$ 0.85 = \$ \text{——} + \text{—— d.} + \text{—— ¢.}$

21. $\$ 5 + 3 \text{ d.} + 8 \text{ ¢} = \$ \text{——.}$

22. $\$ 9 + 7 \text{ d.} + 5 \text{ ¢} = \$ \text{——.}$

23. Read \$0.34.

SUGGESTION. Since $\$0.34 = 3 \text{ d. } 4 \text{ ¢}$, which equals 34 ¢ , then $\$0.34$ may be read *3 dimes and 4 cents*; also *34 cents*.

In practice read:

$\$0.34$, *thirty-four cents*.

$\$2.75$, *two dollars and seventy-five cents*.

Read:

24. \$5.42	25. \$1.53	26. \$0.47	27. \$3.51
28. \$0.05	29. \$0.34	30. \$7.45	31. \$0.08
32. \$9.65	33. \$6.85	34. \$10.50	35. \$12.35

Study these to learn how dollars may be reduced to cents, and cents to dollars:

$$\$3 = 3 \times 100 \text{ ¢} = 300 \text{ ¢}$$

$$\$3.56 = 300 \text{ ¢} + 56 \text{ ¢} = 356 \text{ ¢}$$

Complete:

36. $\$4 = 400 \text{ ¢}$	37. $\$3 = \text{ — } \text{ ¢}$
38. $\$7 = \text{ — } \text{ ¢}$	39. $200 \text{ ¢} = \$2$
40. $500 \text{ ¢} = \$\text{ — }$	41. $900 \text{ ¢} = \$\text{ — }$
42. $\$2.85 = 285 \text{ ¢}$	43. $\$1.25 = \text{ — } \text{ ¢}$
44. $\$0.18 = \text{ — } \text{ ¢}$	45. $146 \text{ ¢} = \$\text{ — }$

Read, and then tell how many cents each is worth:

46. \$2	47. \$3.18	48. \$7	49. \$2.90
50. \$1.10	51. \$1.08	52. \$10.80	53. \$3.50

Tell what each of these is equal to in dollars and cents:

54. 125 ¢	55. 250 ¢	56. 380 ¢	57. 175 ¢
58. 501 ¢	59. 310 ¢	60. 417 ¢	61. 812 ¢

117. Exercise:

1. Here is a leaf from a boy's diary; how much more did he receive than he paid out during the month?

CASH ACCOUNT — OCTOBER					
DATE	ITEM	RECEIVED		PAID	
1	Errand		10		
1	Pigeons		50		
2	Tablet				10
2	Jeneil				05
4	Errand		10		
5	Papers		50		25
7	Car fare				05
8	Errand		10		
10	Apples				05
12	Papers		50		25
13	Collection				05
15	Errand		10		
17	Ball				10
19	Chestnut hunt				15
19	Papers		50		25
20	Collection				05
23	Errand		10		
25	Book				50
26	Papers		50		25
27	Collection				05
30	Hospital				15

2. Memorize this important table :

Table

$50 \text{ ¢} = \$.50 = \$ \frac{1}{2}$
$25 \text{ ¢} = \$.25 = \$ \frac{1}{4}$
$75 \text{ ¢} = \$.75 = \$ \frac{3}{4}$

118. Exercise:

1. Find the cost of 12 bu. of potatoes at \$.75 per bushel.

SUGGESTION. \$.75, or $\$ \frac{3}{4}$ = the cost of 1 bu.
 $12 \times \$ \frac{3}{4}$, or \$ — = the cost of 12 bu.

Find the cost of :

2. 4 lb. tea at \$.75 per pound.
3. 8 yd. gingham at \$.25 per yard.
4. 6 bottles olives at \$.50 per bottle.
5. 14 yd. linen at \$.50 per yard.
6. 12 lb. coffee at \$.25 per pound.
7. 16 yd. silk at \$.75 per yard.
8. 24 bu. oats at \$.50 per bushel.
9. 48 bu. corn at \$.75 per bushel.
10. 36 yd. ribbon at \$.25 per yard.

119. Find the cost of 40 newspapers at 2 ¢ each.

$40 \times 2 \text{ ¢} = 2 \times 40 \text{ ¢}$, which is 80 ¢, the cost.

120. Exercise:

1. Find the cost of 20 two-cent postage stamps.
2. How much should a boy receive for 25 two-cent boxes of matches?
3. Find the cost of 30 three-cent postage stamps.
4. A druggist sold in one evening 45 five-cent soda tickets; how much did he receive for them?
5. How many cents are 20 five-cent pieces worth?
6. How many dollars are 20 dimes and 20 five-cent pieces worth?
7. How many dollars are 4 half dollars and 8 quarter dollars worth?
8. How much does a man earn in 30 days if he is paid \$3 a day?
9. 36 $2\frac{1}{2}$ -dollar gold pieces are worth how many dollars?
10. A boy buys 40 newspapers at a half cent each; how much does he pay for them?
11. How much car fare does a man pay to ride 50 miles at $2\frac{1}{2}\phi$ a mile?
12. How much should a bookseller receive for 25 ten-cent tablets?

121. Find the cost of 65 yards of muslin at 8¢ a yard.

\$0.65

 $65 \times 8\phi = \text{the cost.}$ 8But $65 \times 8\phi = 8 \times 65\phi$, or $8 \times \$0.65$.\$5.20Therefore, $8 \times \$0.65$, or $\$5.20 = \text{the cost.}$ *In practice, multiply by the smaller number.*

122. Exercise:

Find the cost of:

1. 85 lb. beef at 12¢ a pound.
2. 85 bu. clover seed at \$ 8 a bushel.
3. 285 lb. sugar at 7¢ a pound.
4. 115 yd. carpet at \$ 2 a yard.
5. 85 head of sheep at \$ 6 a head.
6. 120 bu. seed at \$ 2 a bushel.
7. A steer weighing 786 lb. at 6¢ a pound.
8. 400 lb. old iron at $\frac{1}{2}$ ¢ a pound.
9. A 350-mile railroad ticket at $2\frac{1}{2}$ ¢ a mile.
10. 126 gal. of vinegar at 25¢ a gallon.
11. 250 tomato plants at 2¢ each.

123. How many 8-cent note books were bought if \$ 2.56 was their cost?

$$\begin{array}{r} 8 \overline{)256} \\ 32 \end{array}$$

\$ 2.56 was the cost of all.

\$ 0.08 was the cost of each.

256 ÷ 8, or 32, was the number bought.

124. Exercise:

Find how many can be bought:

1. 2-cent postage stamps for \$ 2.50.
2. 5-cent loaves of bread for \$ 3.20.
3. 8-cent tablets for \$ 3.60.

4. 12-cent bolts of tape for \$ 8.64.
5. 15-cent handkerchiefs for \$ 3.60.
6. 50-cent bottles olive oil for \$ 4.00.
7. 25-cent ties for \$ 6.25.
8. 12-cent packages of cereal for \$ 2.52.
9. 25-cent packages of biscuit for \$ 6.75.
10. 55-cent bottles of vanilla extract for \$ 3.30.
11. 12-cent cans of corn for \$ 0.60.
12. 5-cent bags of salt for \$ 0.75.
13. 30-cent cans of oatmeal for \$ 1.20.
14. 10-cent packages of puffed wheat for \$ 1.00.
15. 18-cent glasses of jelly for \$ 1.80.
16. 6-cent bars of soap for \$ 0.72.
17. 50-cent balls of twine for \$ 3.50.
18. 15-cent cans of tomatoes for \$ 0.90.
19. 8-cent boxes of tacks for \$ 0.56.
20. 10-cent boxes of shoe polish for \$ 0.30.
21. 35-cent brooms for \$ 1.40.
22. 15-cent brushes for \$ 3.00.
23. 25-cent combs for \$ 1.50.
24. 50-cent pennants for \$ 2.50.

BILLS

125. A Receipted Bill for Goods purchased on the Same Date.

NEW YORK, May 1, 1914.

MR. JNO. WILLIAMS,
219 W. 39th Street,

To C. L. YATES & CO., DR.

Dealers in Provisions,

59 Cortlandt Street

2 Loaves Bread @	5 ¢	10		
2 Cans Peaches @	25 ¢	50		
1 lb. Cheese @	25 ¢	25		
2 lb. Butter @	40 ¢	80		
3 doz. Eggs @	20 ¢	60	2	25
Received Payment				
<i>C. L. Yates & Co.</i>				

126. Exercise :

1. Who purchased this bill of goods?
2. At whose store were these goods bought?
3. There are five **items** in this bill; name them.
4. What is the cost of the first item? the second? the third? the fourth? the fifth?

A bill is **filled** by writing in it the cost of each item, and **footed** by adding the cost of the different items to find the total cost.

5. What is the footing of this bill?
6. To whom was this bill paid?
7. What shows that it has been paid?

127. Exercise :

Rule bill forms and on them make out bills for the following goods. Use your own name for that of the buyer and the name of some firm or person that deals in the goods purchased for that of the seller. Fill, foot, and receipt the bills, dating them appropriately.

1	2
6 lb. coffee, 35¢	15 doz. eggs, \$ 0.24
2 lb. lard, 15¢	18 lb. butter, \$ 0.40
12 lb. sugar, 5¢	20 lb. sausage, \$ 0.12
3	4
4 lb. ham, 12¢	2 pkg. puffed wheat, 10¢
4 cans corn, 13¢	$\frac{1}{2}$ lb. tea, 60¢
2 glasses currant jelly, 18¢	$1\frac{1}{2}$ lb. dried beef, 40¢
2 gal. vinegar, 25¢	$\frac{1}{2}$ doz. bottles sirup, \$2.30

REVIEW

128. Exercise :

1. Tell what each figure stands for in the number 1,111,111.
2. Three numbers can be written with C, X, and I, all being used in each number ; write the numbers.

Add (you should add each in less than half a minute):

3. 87,632

47,832

56,785

67,832

54,549

4. 56,783

78,934

89,763

25,673

49,835

5. Write the greatest whole number that can be written with the figures 1, 0, 7, 9, and 5, and take from it the least that can be written with them.

6. A farmer bought a pair of shoes for \$3.50, 30 lb. sugar at 6¢ a pound, and 3 lb. cheese at 16¢ a pound. He gave in payment 25 doz. eggs at \$0.28 a dozen; what balance was still due him?

7. How many bushels of oats at \$0.50 a bushel should be given for 12 days' hauling at \$3.50 a day?

8. A dealer sold a piano for \$450; if $\frac{1}{5}$ of this was profit, what did the piano cost him?

9. If a laborer earns \$6 in 4 da., he should earn — times \$6 in 8 da.; he should earn \$ — in 12 da.

10. If 2 acres of wheat yielded 40 bu., how much should be raised on 6 acres at the same yield to the acre?

11. A certain clerk earned \$1000 a year; his expenses for one year were \$672; what did he save that year?

12. An engineer earns \$175 a month, and his expenses are \$95; in how many months can he save enough to pay for a \$3840 house? in how many years?

13. Which is the greatest of these fractions: $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{3}{5}$, and $\frac{5}{6}$? which is the least?

14. Write two fractions with the figures 2 and 3; find their sum and their difference.

15. Write a proper fraction; an improper fraction; an integer; a mixed number.

16. Add $2\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{2}$, $1\frac{1}{4}$, and 2.

17. How many \$100 bills are worth \$1,000,000?

18. A man bought a house for \$4500. Improvements on it cost him \$275.50. He sold it at a profit of \$224.50. How much did he receive for it?

19. Find the cost of thrashing 250 bu. of wheat at 4¢ a bushel.

20. Find the cost of 150 pounds of nails at 3¢ a pound.

21. Find the cost of a 950-pound steer at 8¢ a pound.

22. At \$2 a day how many days should a man work to pay for 10 bu. of corn at \$0.90 a bushel?

23. $\$ \frac{1}{2}$ and $\$ \frac{1}{4}$ are how many cents?

24. What profit does a merchant make on 10 bushels of potatoes that he buys for \$1.25 a bushel and sells for \$1.50 a bushel?

MEASURES

(Review Liquid Measures, Dry Measures, and Measures of Weight, pages 121, 122, 124.)

Measures of Time

129. Exercise:

1. Name the months of the year.
2. Name the months that have each thirty days.
3. Name the months that have each thirty-one days.
4. Name the present month.
5. What month will next month be?
6. What month was last month?
7. Name the sixth month; the third; the tenth.
8. What year is this?
9. What year was last year?
10. What year will next year be?
11. Write the present date.
12. Name the days of the week.
13. Name the first day of the week; the sixth; the seventh.
14. How many hours make a day?
15. How many hours are there in the forenoon? the afternoon?
16. Write in a short way:
6 o'clock, forenoon; 9 o'clock, afternoon.
17. Tell what each of these means:
10.15 A.M.; 1.40 P.M.

18. Tell which of these times are day time and which are night:

11.00 P.M.; 2.30 A.M.; 11.00 A.M.; 2.30 P.M.

19. How many hands has this watch?

20. What is the name of the smallest hand?

21. Count sixty while the smallest hand turns once; you have counted sixty seconds, or one minute.



130.

Table

60 seconds (sec.)	= 1 minute (min.)
60 minutes	= 1 hour (hr.)
24 hours	= 1 day (da.)
7 days	= 1 week (wk.)
28, 29, 30, or 31 days	= 1 month (mo.)
12 months	= 1 year (yr.)
365 days	= 1 common year
366 days	= 1 leap year

131. Exercise :

1. How many seconds are there in 2 min.? 3 min.? $\frac{1}{2}$ min.? $\frac{1}{4}$ min.? $\frac{1}{6}$ min.? $\frac{1}{10}$ min.?

2. How many minutes are there in 3 hr.? $1\frac{1}{2}$ hr.? $\frac{1}{3}$ hr.? $\frac{2}{3}$ hr.? $\frac{3}{4}$ hr.?

3. How many hours are there in 2 da. ? $2\frac{1}{2}$ da. ? $\frac{1}{2}$ da. ? $\frac{3}{4}$ da. ?

4. What part of a day is 8 hr. ? 6 hr. ? 12 hr. ? 10 hr. ?

5. How many hours are there :

5. From 6.00 A.M. to noon ? noon to 9.00 P.M. ? midnight to 6.00 A.M. ?

6. From 3.00 P.M. to midnight ? 8.00 A.M. to 4.00 P.M. ?

7. From 6.30 A.M. to 8.30 A.M. ? 2.30 P.M. to 5.30 P.M. ? 10.30 A.M. to noon ? noon to 2.30 P.M. ? 11.30 A.M. to 1.30 P.M. ?

8. A man who works from 7 A.M. to 6.00 P.M., stopping 1 hr. for dinner, works how many hours ?

9. At 30 ¢ an hour, how much should an operator earn from midnight to 8.00 A.M. ?

10. How much must be paid for one year's house rent at \$25 a month ?

11. A family that uses 1 pt. of cream a day uses how many quarts during the month of June ?

12. The spring months are March, April, and May. How many days are there in the spring months ?

13. A man paid at a hotel \$1 a day for lodging and 50 ¢ a meal. At this rate how much would his board and lodging amount to for a week, counting 3 meals a day ?

Measures of Length

132.

Table

12 inches (in.)	= 1 foot (ft.)
3 feet	= 1 yard (yd.)
$5\frac{1}{2}$ yards	= 1 rod (rd.)
320 rods	= 1 mile (mi.)
1760 yd. }	= 1 mile.
5280 ft. }	

133. Exercise :

(Answer as many as possible orally.)

- How many inches are there in 2 ft. ? 3 ft. ? 4 ft. ?
- How many feet are there in 2 yd. ? 5 yd. ? 8 yd. ?
- How many inches are there in $\frac{1}{2}$ ft. ? $\frac{1}{3}$ ft. ? $\frac{1}{4}$ ft. ?
- How many feet are there in $\frac{1}{2}$ yd. ? $1\frac{1}{2}$ yd. ? $2\frac{1}{2}$ yd. ?

Supply the missing numbers in Examples 5-11 :

- 24 in. = — ft.; 36 in. = — ft.; 48 in. = — ft.
- 15 in. = — ft. — in.; 28 in. = — ft. — in.;
32 in. = — ft. — in.
- 12 ft. = — yd.; 24 ft. = — yd.; 60 ft. = — yd.
- 7 ft. = — yd. — ft.; 11 ft. = — yd. — ft.;
25 ft. = — yd. — ft.
- $5\frac{1}{2}$ yd. = — ft.; 1 rod = — ft.

10. $320 \text{ rods} = 320 \times 5\frac{1}{2} \text{ yd.}$, or ——— yd.

11. $320 \text{ rods} = 320 \times 16\frac{1}{2} \text{ ft.}$, or ——— ft.

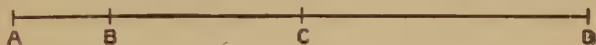
12. How many yards are there in 2 rd.? in 3 rd.? in 4 rd.?

13. How many rods are there in 2 mi.?

14. How many rods are there in $1\frac{1}{2}$ mi.?

134. Exercise :

1. How long is AB ? BC ? CD ? AD ? AC ? BD ?
(Measure each.)



If BC represents 10 ft., we say that AD is drawn to a scale of 1 in. to 10 ft.; and we write :

Scale : 1 in. = 10 ft. ; or in practice, $1'' = 10'$.

2. When the scale is $1'' = 10'$, what is the distance from : C to D (Fig. Ex. 1)? A to B ? A to D ? B to D ?

3. When the scale is $1'' = 100'$, what is the distance from : B to C (Fig. Ex. 1)? B to A ? B to D ? C to A ?

4. In this *plan*, or *map*, of a field, how long is each side?



Scale: $1'' = 40 \text{ rd.}$

Draw a plan of the following :

5. A square 100 ft. long; scale:
 $1'' = 20'$.

6. A square 10 yd. long ; scale : $1'' = 2$ yd.
7. A floor 24 ft. long, 18 ft. wide ; scale : $1'' = 6'$.
8. A field 80 rd. long, 20 rd. wide ; scale : $1'' = 20$ rd.
9. How far are two cities apart if the distance between them is shown on a map to be $2\frac{1}{2}$ in. ; scale : $1'' = 100$ mi. ?
10. How far are two cities apart if the distance between them is shown on a map to be 3 in. ; scale : $1'' = 7\frac{1}{2}$ mi. ?

6 feet is sometimes called a fathom.

(Used to measure the depth of the ocean.)

11. The Atlantic Ocean at a certain point is found to be 120 fathoms deep ; how many feet deep is it there ?
12. The greatest depth of the Pacific Ocean is stated to be 35,000 ft. ; how many fathoms deep is that ?

Angles

135. The opening between two straight lines that meet is called an **angle**.



1. Point to two lines in the room that form a right angle.
2. Draw an acute angle ; an obtuse angle.

Measures of Surface

The Square

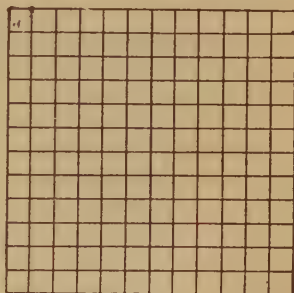
136. Exercise :

1. How many angles has a square ?
2. What kind of angles has a square ?
3. How many sides has a square ?
4. How do the sides of a square compare in length ?



Square

5. Here is a square representing a square foot divided into square inches; scale : $1'' = 8''$.



How many square inches are there in one row ?

How many rows of square inches are there ?

How many square inches are there in the square ?

144 square inches = 1 square foot.

6. How many square inches are there in $\frac{1}{2}$ of a square foot ?
7. How many square inches are there in $\frac{1}{4}$ of a square foot ?
8. How many square inches are there in $\frac{1}{8}$ of a square foot ?

9. What part of a square foot is 12 square inches?

10. This drawing represents a square yard divided into square feet; what is the scale?



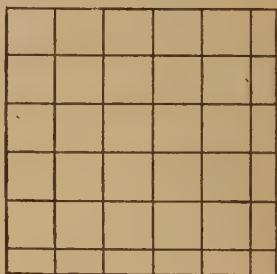
11. How many square feet are there in a square yard?

12. How many square feet are there in $2\frac{1}{2}$ square yards?

13. How many square yards are there in 18 square feet?

14. 20 sq. ft. = ——— sq. yd. ——— sq. ft.

15. This drawing represents a square 1 rod long (scale $1'' = 4$ yd.) divided as far as possible into square yards.



What does each of the large squares represent?

What does the small square represent?

What does each oblong represent?

How many large squares are there? how many oblongs?

How many oblongs represent a square yard?

$$30\frac{1}{4} \text{ square yards} = 1 \text{ square rod.}$$

Table

144 square inches (sq. in.)	= 1 square foot (sq. ft.)
9 square feet	= 1 square yard (sq. yd.)
$30\frac{1}{4}$ square yards	= 1 square rod (sq. rd.)
160 square rods	= 1 acre (A.)

16. How many square yards are there in 2 square rods?

17. How many square yards are there in 4 square rods?

This drawing represents a square 20 rd. long.

18. How many squares each 1 rd. long could be placed along one side of this square? how many rows of such squares could be placed in the whole square?



Scale: 1" = 20 rd.

20×20 , or $400 =$ the number of square rods in the square.

19. How many square rods are there in a square 10 rd. long?

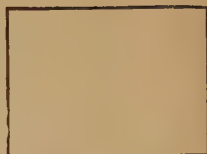
20. Make a drawing of a tract of land in the form of a square 80 rd. long; scale: 1" = 20 rd. How many acres are there in the square?

21. Make a drawing of a tract of land in the form of a square 60 rd. long; scale: 1" = 6 rd. How many acres are there in the square?

The Rectangle

137. Exercise :

1. How many sides has a rectangle ?
2. How do the opposite sides of a rectangle compare in length ?
3. How many angles has a rectangle ? what kind ?



Rectangle

4. $ABCD$ represents a rectangle 4 in. long and 3 in. wide, divided into square inches. How many square inches are there in 1 row of $ABCD$? how many rows ? how many square inches are there in $ABCD$?

Scale: $1'' = 4''$

5. How many square inches are there in a rectangle 4 in. long and 3 in. wide (4 in. by 3 in.) ?
6. How many square inches are there in a rectangle :
4 in. by 2 in. ? 6 in. by 4 in. ? 8 in. by 6 in. ?
7. How many square feet are there in a rectangle :
8 ft. by 4 ft. ? 10 ft. by 6 ft. ? 20 ft. by $\frac{1}{2}$ ft. ?
8. How many square yards are there in a rectangle :
5 yd. by 2 yd. ? 3 yd. by $\frac{1}{2}$ yd. ? 10 yd. by $2\frac{1}{2}$ yd. ?
9. How many square feet are there in a side wall of a room 20 ft. long and 8 ft. high ?
10. How many square feet are there in the ceiling of a room 30 ft. long and 18 ft. wide ?
11. How many square yards of bunting will make a flag $3\frac{1}{2}$ yd. long and 2 yd. wide ?

12. How many square rods are there in a lot 33 rd. long and $4\frac{1}{2}$ rd. wide?

13. How many acres are there in a tract of land 40 rd. long and 4 rd. wide?

14. How many acres are there in a field 80 rd. long and 20 rd. wide?

15. How many square yards of oilcloth are required to cover a floor 21 ft. long and 18 ft. wide?

Plan of a Garden



Scale : 1" = 4'

138. Exercise:

1. Measure carefully the lines on the above plan.
2. What is the length of the onion bed? the width?
3. What is the length of the cabbage bed? the width?
4. What is the length of the lima bean bed? the width?
5. What is the width of each walk?

6. How long is the walk joining the cabbage bed with the onion bed?

7. Make a drawing on the blackboard of this garden; scale: $1'' = 1'$.

8. How many feet are there in the distance around this garden?

9. How many square feet are there in the onion bed?

10. How many square feet are there in the cabbage bed?

11. How many square feet are there in the lima bean bed?

12. How many square feet are there in the walks?

The Cube

139. Exercise :

1. Count the edges of a cube ; how many are there ?

2. How many faces has a cube ; how many corners ?

3. Measure the length and width of the front face of the cube in Fig. 1.

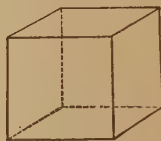


Figure 1

The edges of a cube are equal.

4. How long is each edge of the cube shown in Fig. 1 ?

A cube each of whose edges is one inch long is a cubic inch or a 1-inch cube.

5. Fig. 2 represents one large cube and how many small ones?

If each small cube in Fig. 2 were a cubic inch, how many cubic inches would there be in the large cube?

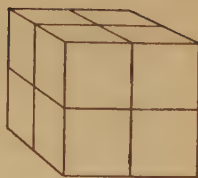


Figure 2

How many inches long would each edge of the large cube be?

A cube each of whose edges is two inches long is a 2-inch cube.

6. How many cubic inches are there in a 2-inch cube?

7. What is meant by a 1-foot cube?

8. How many inches long is a 1-foot cube? how many inches wide? how many inches high?

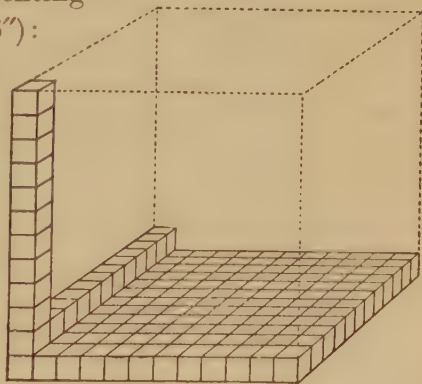
9. In this figure representing a cubic foot (scale: 1" = 8"):

How many cubic inches are there in 1 row?

How many rows are there in 1 layer?

How many cubic inches are there in 1 layer?

How many cubic inches are there in the cube?



$12 \times 12 \times 12$, or — = the number of cubic inches in a cubic foot.

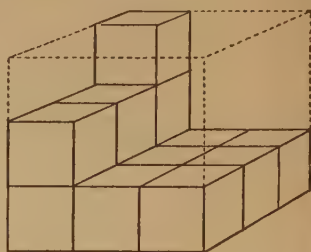
10. This figure represents a cubic yard (scale: $1'' = 3'$).
How many cubic feet are there
in a row?

How many rows are there in 1
layer?

How many cubic feet are there
in 1 layer?

How many layers of cubic feet
are there in the cube?

How many cubic feet are there in the cube?



Table

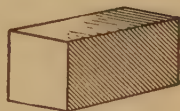
1728 cubic inches (cu. in.)	= 1 cubic foot (cu. ft.)
27 cubic feet	= 1 cubic yard (cu. yd.)

11. How many cubic feet are there in 2 cu. yd.?
12. How many cubic inches are there in 3 cu. ft.?
13. How many cubic yards are there in 81 cu. ft.?
14. How many cubic inches are there in $\frac{1}{2}$ cu. ft.?
15. How many cubic inches are there in a 3-ft. cube?
16. 1 bushel = $\frac{5}{4}$ cu. ft. nearly; 15 cu. ft. = about how many bushels?
17. How many cubic feet are there in a cubical box, each edge of which is 2 ft. long?

The Rectangular Solid

140. Exercise :

1. How many faces has a rectangular solid?
2. What kind of figures are the faces of a rectangular solid?
3. How many edges has a rectangular solid? How many corners?



Rectangular Solid

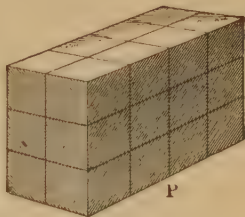
4. Figure *P* represents a rectangular solid divided into equal cubes.

How many cubes are there in each row of the upper layer?

How many rows of cubes are there in the upper layer?

How many cubes are there in the upper layer?

How many layers of cubes are there in the rectangular solid?



$3 \times 2 \times 4 =$ the number of cubes in *P*.

5. If each cube in *P* were a cubic inch, how many cubic inches would there be in the rectangular solid?
6. If each cube in *P* were a cubic foot, how many cubic feet would there be in the rectangular solid?
7. How many cubic feet are there in a rectangular solid 4 ft. long, 3 ft. wide, and 5 ft. high?
8. How many cubic inches are there in a rectangular solid 6 in. long, 4 in. wide, and 2 in. high?

9. How many cubic feet of earth will a box hold that is 10 ft. long, 3 ft. wide, and 2 ft. deep?

10. How many cubic feet are there in a rectangular solid 8 ft. long, 4 ft. wide, and 4 ft. high?

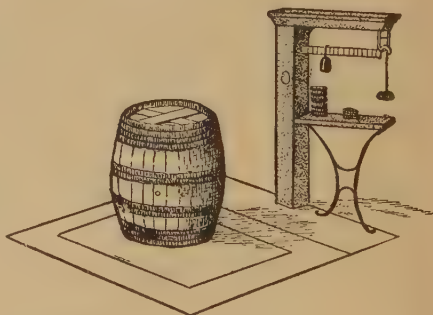
11. How many cubic feet are there in a bin 12 ft. long, 8 ft. wide, and 4 ft. deep?

12. A pile of wood 8 ft. long, 4 ft. wide, and 4 ft. high is called a **cord**; how many cubic feet are there in a cord?

Measures of Weight

141. 1. In weighing many heavy articles 100 pounds is called a **hundredweight**.

2. 20 hundredweight, or 2000 pounds is called a **ton**.



142.

Table

100 pounds (lb.)	= 1 hundredweight (cwt.)
20 hundredweight	= 1 ton (T.)
2000 pounds	= 1 ton
2240 pounds	= 1 long ton

143. Exercise:

1. Find the cost of shipping furniture weighing 1200 lb. at 40¢ per hundredweight.
2. How many tons are there in 4000 lb.? in 8000 lb.? in 6000 lb.?
3. A freight car that is loaded with 40,000 lb. is carrying how many tons?
4. A load of 12 bales of cotton, 500 lb. to the bale, weighs how many tons?
5. How many pounds are there in $2\frac{1}{2}$ tons?
6. What should a man pay for 3000 lb. of fertilizer at \$30 a ton?
7. Coal in Pennsylvania is sometimes sold by the long ton; how many pounds should a purchaser of coal in Pennsylvania receive in 2 tons?
8. Find the cost of 50 bales of hay, 100 lb. to the bale, at \$25 a ton.
9. How many tons of fertilizer does a farmer sow on 10 acres if he sows 400 lb. to the acre?

MISCELLANEOUS TABLES

144. Paper:

Table

24 sheets = 1 quire

20 quires = 1 ream

145. Counting:

Table

12 units = 1 dozen (doz.)

12 dozen = 1 gross (gro.)

12 gross = 1 great gross (G. gro.)

20 units = 1 score

146. Exercise:

1. How many sheets of paper are there in 3 quires?
2. How many sheets of paper are there in $2\frac{1}{2}$ quires?
3. How many sheets are there in a ream?
4. How many sheets are there in $\frac{1}{2}$ a ream?
5. A dealer bought $\frac{3}{4}$ of a ream of paper for \$1 and sold it at 1 ¢ a sheet; how much was his profit?
6. How many eggs are there in $2\frac{1}{2}$ dozen?
7. Find the cost of $\frac{1}{2}$ doz. eggs at 30 ¢ a dozen.
8. After 6 eggs out of 3 doz. were broken, how many remained?
9. What should be paid for 8 eggs at 30 ¢ a dozen?
10. When oranges are selling at the rate of 3 for 10 ¢, how much is that a dozen?

SUGGESTION. 12 is how many times 3?

11. When matches are selling at the rate of 3 boxes for 5 ¢, what should be paid for 1 dozen boxes?

12. When matches are selling at 6 boxes for 25¢, how much is that a gross?

13. How many crayons are there in 3 boxes, each containing a gross?

Find the gain on:

14. 2 reams of water-color paper bought at \$20 a ream and sold at 5¢ a sheet.

15. 2 quires of blotters bought at 60¢ a quire and sold at 3¢ each.

16. 6 doz. notebooks bought at \$1.20 a dozen and sold at 12¢ each.

17. 1 gross of pencils bought at \$3 and sold at 2 for 5¢.

18. 3 reams of drawing paper bought at 35¢ a ream and sold at 3 sheets for 1¢.

19. $2\frac{1}{2}$ doz. tablets bought at 50¢ a dozen and sold at 5¢ each.

20. 6 doz. lemons bought at 25¢ a dozen and sold at 2 for 5¢.

21. 20 doz. eggs bought at 25¢ a dozen and sold at 30¢ a dozen, if 1 dozen were unsalable.

GENERAL REVIEW

Read:

1. A steel sleeping car weighs about 152,300 lb. It is $72\frac{1}{2}$ ft. long, 9 ft. wide, and $9\frac{1}{2}$ ft. high; it costs \$27,000.

2. In a recent year there were 5,739,657 farms in the United States, averaging 147 acres: 1,933,243 of these

contained from 1 to 50 acres; 1,366,167 from 50 to 100 acres; 2,290,424 from 100 to 500 acres; and 149,823 over 500 acres.

3. Write by the Roman system the number of the present year.

Add each in less than half a minute:

4. 27459	5. 96812	6. 5492
36821	15573	98613
59036	20869	329
96246	92435	46149
71943	6148	5873
<u>62278</u>	<u>934</u>	<u>81257</u>

Subtract:

7. 84123	8. 71652	9. 57465	10. 64531
<u>26495</u>	<u>52974</u>	<u>9578</u>	<u>6942</u>

Multiply:

11. 23×99	12. 46×87	13. 34×65
14. 52×75	15. 48×94	16. 10×89
17. 27×68	18. 50×86	19. 39×76
20. 56×275	21. 47×486	22. 20×569
23. 63×732	24. 70×794	25. 89×867

Find the quotient and the remainder:

26. $875 \div 26$	27. $781 \div 31$	28. $689 \div 34$
29. $6875 \div 42$	30. $8653 \div 54$	31. $7769 \div 88$

32. $6592 \div 97$ 33. $8914 \div 75$ 34. $9665 \div 94$
 35. $57834 \div 79$ 36. $70418 \div 78$ 37. $98107 \div 86$
 38. $69877 \div 74$ 39. $87653 \div 96$ 40. $92946 \div 95$

41. A complete aluminum kitchen outfit, suitable for a family of from five to eight, includes the following list; find the total cost at the prices given:

ARTICLE	PRICE	ARTICLE	PRICE
Tea Strainer . . .	\$.15	Sheet Tea Kettle .	\$ 3.40
Coffee Pot . . .	1.84	Preserving Kettle .	1.32
Tea Pot . . .	2.32	Covers	.88
Lipped Sauce Pan .	.44	Double Boiler . . .	1.68
Lipped Sauce Pan .	.84	Measuring Cup . .	.28
Berlin Sauce Pan .	.84	Pie Plates	1.18
Pudding Pan . . .	.56	Funnel	.48
Pudding Pan . . .	.68	Roaster	3.44
Cake Pans	1.32	Round Griddle . .	2.40
Tubed Cake Pan . .	.96	2 Fry Pans @ \$1.60	3.20
Bread Pans . . .	2.24	Colander	2.00
Corn Cake Pan . .	.88	Total	

Find:

42. $\frac{2}{3}$ of 120 43. $\frac{7}{10}$ of 770 44. $\frac{2}{3}$ of \$6.42
 $\frac{3}{4}$ of 576 $\frac{6}{7}$ of 756 $\frac{3}{4}$ of \$9.24
 $\frac{5}{6}$ of 426 $\frac{8}{9}$ of 918 $\frac{7}{8}$ of \$9.84

Supply at sight the missing numerators:

45. $\frac{1}{2} = \frac{\quad}{4} = \frac{\quad}{6} = \frac{\quad}{8} = \frac{\quad}{10} = \frac{\quad}{12}$

46. $\frac{1}{3} = \frac{\quad}{6} = \frac{\quad}{9} = \frac{\quad}{12} = \frac{\quad}{15}$

47. $\frac{1}{4} = \frac{2}{8} = \frac{3}{12} = \frac{4}{16} = \frac{5}{20}$

48. $\frac{1}{5} = \frac{2}{10} = \frac{3}{15} = \frac{4}{20} = \frac{5}{25}$

49. $\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12} = \frac{10}{15}$

50. $\frac{3}{4} = \frac{6}{8} = \frac{9}{12} = \frac{12}{16} = \frac{15}{20}$

Add :

51. $\frac{2}{3} + \frac{3}{4} + \frac{5}{6}$

52. $1\frac{1}{2} + 3\frac{3}{4} + 5\frac{5}{6}$

53. $2\frac{1}{2} + \frac{2}{3} + \frac{7}{8}$

54. $\frac{4}{5} + 1\frac{1}{2} + \frac{9}{10}$

55. $2\frac{3}{4} + 2\frac{2}{3} + 3\frac{1}{2}$

56. $7\frac{1}{2} + 3\frac{1}{3} + \frac{3}{4}$

Subtract :

57. $\frac{7}{8} - \frac{2}{3}$

58. $\frac{5}{6} - \frac{2}{3}$

59. $2 - 1\frac{3}{4}$

60. $3\frac{1}{4} - 1\frac{7}{8}$

61. $12\frac{1}{2} - 6\frac{3}{4}$

62. $33\frac{1}{6} - 16\frac{2}{3}$

Answer at sight :

63. $3 \times \frac{2}{7}$
 $3 \times \frac{2}{9}$

64. $3 \times 1\frac{1}{4}$
 $\frac{6}{7} \div 3$

65. $\frac{2}{3} \div 3$
 $3\frac{1}{3} \div 3$

Multiply :

66. $8 \times 24\frac{3}{4}$

67. $12 \times 56\frac{2}{3}$

68. $20 \times 24\frac{3}{4}$

69. $50 \times 75\frac{4}{5}$

70. $72 \times 65\frac{7}{8}$

71. $69 \times 58\frac{2}{3}$

72. From a piece of cloth, containing 20 yd., a merchant cut $2\frac{1}{2}$ yd. at one time and $3\frac{3}{4}$ yd. at another; how much remained?

73. A boy who has \$ $7\frac{3}{4}$ in a savings bank must deposit how much more to have \$10?

74. A farmer has $2\frac{1}{2}$ A. planted with sweet corn, $1\frac{1}{4}$ A. planted with potatoes, $\frac{3}{8}$ A. planted with tomatoes, $\frac{1}{4}$ A.

planted with cabbage, and the remainder of a 5-acre lot with strawberries; how much ground has he planted with strawberries?

75. The distance from New York to Trenton is 58.2 mi. and from New York to Wilmington by way of Trenton 118.4 mi.; how far is it from Trenton to Wilmington?

76. A merchant had on hand at the beginning of a day's sales \$86.42. During the day he took in \$75.39, and paid out \$29.13; how much money had he on hand at the close of the day?

77. A laborer worked for a merchant for 265 days at \$1.50 a day. He bought from the merchant a suit of clothes for \$18.50, a pair of shoes for \$2.75, and groceries to the amount of \$56.15. The balance was paid in cash; how much cash was paid?

78. How many rods of fence are required to inclose a rectangular field 80 rd. long and 20 rd. wide?

79. How many acres are there in a rectangular field 80 rd. long and 20 rd. wide?

80. When the thermometer registers 18° , how many degrees is the temperature below freezing point?

81. 4 lb. of beef will lose about 1 lb. 5 oz. in roasting; what should it weigh when roasted?

82. 10 eggs are estimated to weigh 1 lb.; at this estimate, what is the weight of 5 doz. eggs?

83. Write the table of liquid measure.

84. How many gallons are there in 4 bbl. ($31\frac{1}{2}$ gal.)?

85. This tank holds 630 gallons; how many hogsheads (63 gal.) does it hold?

86. A grocer bought a barrel ($31\frac{1}{2}$ gal.) of vinegar for \$5 and sold it at 30¢ a gallon. Find his profit.

87. Write the table of dry measure.

88. A dealer bought potatoes at \$1.20 a bushel and retailed them at 20¢ a half peck. What was his gain?

89. A boy sold $\frac{1}{2}$ bu. of chestnuts at 10¢ a quart. How much did he receive for them?

90. Write the table of weight.

91. How many 4 oz. packages can be made from 2 lb.?

92. What does a family save by buying a ton of coal for \$6.50 instead of buying it by the bucket at 20¢ a bucket, if 56 buckets of the size bought make a ton?

93. Write the table of United States money.

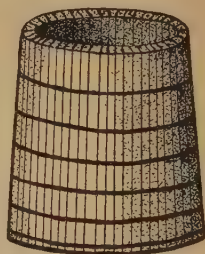
94. How many dimes are worth a quarter eagle?

95. How much money has a boy who has a \$5 gold piece, a \$1 bill, a half dollar, a quarter dollar, a dime, a nickel, and a cent?

96. Write the table of length.

97. What is the distance around a room that is 20 ft. long and 12 ft. wide?

98. How many feet are there in a quarter of a mile?



99. To measure the height of horses the measure used is called a **hand** (4 inches); how high is a horse that measures 15 hands?

100. Write the table of square measure.

101. How many square feet are there in the walls and the ceiling of a room 24 ft. long, 18 ft. wide, and 10 ft. high?

102. How many square inches of paper will cover a box 8 in. long, 6 in. wide, and 4 in. high?

103. Write the table of cubic measure.

104. A cubic foot of ice is estimated to weigh 57 lb. Estimate the weight of a block of ice 3 ft. long, 2 ft. wide, and $1\frac{1}{2}$ ft. thick.

105. How many 200-lb. sacks of fertilizer will weigh a ton?

106. How many square yards are there in a rug 12 ft. long and 9 ft. wide?

107. Write the table of time.

108. 52 weeks and how many days make a common year?

109. A keg of powder weighs 25 lb. How many kegs will make a load weighing a ton?

110. How many hours are there from 2 A.M. to 6 P.M.?

111. Under fair conditions sweet corn will yield about 2000 lb. per acre. At this rate how many tons should 3 acres yield?

112. How many hours are there from 6 P.M. Tuesday to 3 A.M. Wednesday?

113. Timothy seed weighs 45 lb. to the bushel; find the weight of 10 two-bushel bags of it.

114. Find the cost of 2 rd. of terra cotta pipe at 8 ¢ a foot.

115. A ship was sunk in 60 fathoms of water; how many feet deep was the water?

116. A train ran 240 mi. from 9.15 A.M. to 9.15 P.M.; what was the average distance that it ran each hour?

117. 60 days after June 1st comes on what date? (Do not count June 1st.)

118. Find the amount of this thrashing bill:

500 bu. of wheat at 4 ¢ a bushel.

450 bu. of oats at $2\frac{1}{2}$ ¢ a bushel.

60 bu. of rye at 5 ¢ a bushel.

30 bu. of buckwheat at 5 ¢ a bushel.

5 bu. of clover seed at \$ 1 a bushel.

3 men, each \$ 1.50 a day for $2\frac{1}{2}$ da.

Boarding 3 men for $2\frac{1}{2}$ da. at 90 ¢ each per day.

119. A man bought a cord of wood for \$ 4.75 and four tons of coal at \$ 6.50 a ton; what was the total cost?

120. A common brick is 8 in. long, 4 in. wide, and 2 in. thick; how many cubic inches does it contain?

121. A horse requires per day about 3.08 lb. of hay for each 100 lb. of his weight; how much hay at this estimate does a 1000-lb. horse require per day?

122. The cost of sending a telegram from Philadelphia to St. Louis is 50¢ for ten words or less and 3¢ for each word over 10; how much does it cost to send a telegram of 14 words?

123. A milkman delivers at a home a quart of milk in the morning and a pint in the evening; how much is his bill for a week if he charges 8¢ a quart?

124. 20 bales of cotton, 500 lb. to the bale, will make how many tons?

125. A cubic foot of water weighs $62\frac{1}{2}$ lb.; what weight will a tank hold that is 6 ft. long, 2 ft. wide, and 2 ft. deep?

126. A sawyer who charges \$4.00 for sawing 1000 shingles will charge how much for sawing 6000?

127. A boy who attends school 20 days each month, for 9 months, attends how many days?

128. A farmer sold his crop of wheat, weighing 47520 lb., at 90¢ a bushel (60 lb.); how much did he receive for it?

129. A clerk who spends 10¢ a day for street-car fare during July and August spends how much for fares during these two months?

130. How many yards of thread are there on a dozen spools, 200 yd. to the spool?

131. What is received for 12 doz. pens sold 2 for 1¢?

132. How many feet of molding will reach around a room 24 ft. long and 20 ft. wide?

FOR REFERENCE

STATE OF INDIANA

Office of

State Commissioner of Weights and Measures

To All to Whom These Presents Shall Come — Greeting:

I, H. E. Barnard, State Commissioner of Weights and Measures of the State of Indiana, hereby certify that the following list contains a true and complete copy of the Standard Weights and Measures, as provided by statute, as it now exists, together with rules regulating the sale of certain commodities in Indiana.

In TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seal of the State of Indiana, at Indianapolis, this 29th day of April, 1914.

(Signed) H. E. BARNARD, State Commissioner.

A bushel of the respective articles thereafter mentioned shall mean the amount of weight, avoirdupois, in this section, specified as follows:

Apples, dried.....	25 lbs.	Onions.....	48 lbs.
Barley.....	48 lbs.	Osage Orange.....	33 lbs.
Beans.....	60 lbs.	Parsnips.....	55 lbs.
Beans, Castor.....	46 lbs.	Peaches, dried.....	33 lbs.
Buckwheat.....	50 lbs.	Potatoes.....	60 lbs.
Coal, mineral.....	80 lbs.	Potatoes, sweet.....	55 lbs.
Corn meal.....	50 lbs.	Rye.....	56 lbs.
Corn, pop.....	56 lbs.	Salt.....	50 lbs.
Corn (in ear until Dec. 1).....	70 lbs.	Seed, blue grass.....	14 lbs.
Corn (in ear after Dec. 1).....	68 lbs.	Seed, clover.....	60 lbs.
Corn, shelled.....	56 lbs.	Seed, hemp.....	44 lbs.
Cranberries.....	33 lbs.	Seed, Millet.....	50 lbs.
Malt rye.....	35 lbs.	Seed, orchard.....	14 lbs.
Middlings, fine.....	40 lbs.	Seed, timothy.....	45 lbs.
Middlings, coarse.....	30 lbs.	Turnips.....	55 lbs.
Oats.....	32 lbs.	Wheat.....	60 lbs.

Rules Regulating the Sale of Certain Commodities in Indiana.

Rule 1. BUTTERS. Butter, butterine, oleomargarine, etc., unless sold by weight shall not be sold or offered for sale in the State of Indiana in the form of prints, rolls, tubs, etc., which are not marked in bold-faced type on the outside of the wrapper or container, the net avoirdupois weight in pounds or ounces.

Rule 2. LARD. Lard, unless sold by weight, shall not be sold or offered for sale in the State of Indiana in pails or containers which are not marked in bold-faced type on the outside of the pail or container, the net avoirdupois weight in pounds or ounces.

Note. — Butter, lard, etc., must be sold by net weight. Sale by gross weight, including the tray, carton or pail is in violation of the law.

Rule 3. DRY COMMODITIES. Dry commodities, such as beans, peas, corn, seeds, cranberries, etc., shall not be sold or offered for sale in the State of Indiana by liquid measure.

Rule 4. FLOUR. Wheat flour, buckwheat flour, gluten flour, rye flour, graham flour, corn meal, etc., unless sold by weight, shall not be sold or offered for sale in the State of Indiana in the form of sacks, bags or containers, etc., which are not marked in bold-faced type on the outside of the sack, bag or container, the net avoirdupois weight in pounds or ounces.

Rule 5. VEGETABLES. Potatoes, sweet potatoes, turnips, onions, etc., unless sold by weight, shall not be sold or offered for sale in the State of Indiana, in bags, baskets, boxes, crates, etc., which are not marked in bold-faced type on the outside of the bag, basket, box, crate, etc., the net avoirdupois weight in pounds or ounces or standard measure.

Rule 6. FRUIT. Apples, peaches, pears, oranges, lemons, etc., unless sold by standard weight or measure, shall not be sold or offered for sale in the State of Indiana in baskets, boxes or crates which are not marked in bold-faced type on the outside of the basket, box or crate, etc., the net avoirdupois weight in pounds or ounces or standard measure; or in the case of oranges, apples, lemons, etc., which are usually and customarily sold by numerical count, the number of apples, oranges, lemons, etc., shall be plainly marked on the outside of the basket, box or crate, etc.

Rule 7. SMALL FRUITS. Raspberries, strawberries, blackberries, plums, etc., shall not be sold or offered for sale in the State of Indiana in boxes or containers which are not the standard dry quart or pint.

Rule 8. CEREALS. Oat meal, corn flakes, breakfast foods in packages, etc., unless sold by weight, shall not be sold or offered for sale in the State of Indiana in boxes, packages or containers which are not marked in bold-faced type on the outside of the box, package or container, the net avoirdupois weight in pounds or ounces.

Rule 9. COFFEE. Coffee, tea, etc., unless sold by weight, shall not be sold or offered for sale in the State of Indiana in cans, packages, bags, containers, etc., which are not marked in bold-faced type on the outside of the can, package, bag or container, etc., the net avoirdupois weight in pounds or ounces.

Rule 10. CURED MEATS. Hams, bacon, dried beef and smoked or cured meat products, unless sold by weight, shall not be sold or offered for sale in the State of Indiana in paper, cloth, burlap or other wrapping material unless the net avoirdupois weight in pounds or ounces is marked in bold-faced type on the outside of the wrapper in which the meat is contained.

Rule 11. COAL. Hard coal, soft coal, coke, etc., unless sold by standard weight, shall not be sold or offered for sale in the State of Indiana in baskets, boxes, bags, wagon boxes, etc., unless a certificate be delivered to the consumer by the person selling the coal plainly showing the number of pounds or ounces contained in said basket, box, bag, wagon box, etc.

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13 Aug

INDIANA EDITION

Price 30 Cents

**Any deviation from this
price should be reported
immediately to Silver,
Burdett & Company**